

# **WAPA IRP**

## **Cooperative Filing**

**for the cities of:**

**Beresford, South Dakota  
Brookings, South Dakota  
Flandreau, South Dakota  
Fort Pierre, South Dakota  
Hillsboro, North Dakota  
Pierre, South Dakota  
Vermillion, South Dakota  
Watertown, South Dakota  
Winner, South Dakota  
Valley City, North Dakota**

**September 1, 2014**

## Table of Contents

<b>I.</b>	<b>MRES Resource Planning.....</b>	<b>1</b>
	<b>A. Overview .....</b>	<b>1</b>
	<b>B. Resource Plan Goals .....</b>	<b>1</b>
	<b>C. Load Forecasting.....</b>	<b>3</b>
	i. Develop Long-Term Forecast .....	3
	ii. Develop Short-Term Forecast .....	3
	iii. Blend Short-Term and Long-Term Forecasts .....	4
	v. Calculate MRES Generation Requirements.....	5
	<b>D. Generation Resources.....</b>	<b>6</b>
	<b>E. MRES Resource Planning Development .....</b>	<b>6</b>
	i. Modeling Method.....	6
	ii. Needs for Additional Capacity and Energy .....	7
	iii. Resource Options Considered.....	7
	iv. Future DSM Activities.....	8
	v. Renewable Energy Resources .....	9
	vi. Emission Costing .....	9
	<b>F. Resource Planning Results.....</b>	<b>9</b>
	<b>G. Implementation .....</b>	<b>10</b>
	i. DSM Task Force .....	10
	ii. Bright Energy Solutions.....	10
	<b>H. BES Programs Designed to Meet Goals.....</b>	<b>11</b>
	i. BES Savings Results .....	11
	<b>I. Cost-Effectiveness of BES Programs .....</b>	<b>13</b>
	i. Economic Analysis of Energy Efficiency .....	13
	ii. Member Program Selection .....	14
	iii. Calculation of Savings .....	21
	iv. Environmental Benefits .....	22
	<b>J. Coordinated Demand Response Program .....</b>	<b>22</b>
	ii. CDR Participation .....	23
	iii. CDR Results.....	23
<b>II.</b>	<b>Beresford, SD Resource Planning .....</b>	<b>24</b>
	<b>A. City Information .....</b>	<b>24</b>
	Exhibit 1 .....	25
	Exhibit 2.....	26
	Exhibit 3.....	27
	Exhibit 4.....	28
	Exhibit 5.....	29
	Exhibit 6.....	30
	Exhibit 7.....	31
	Exhibit 8.....	32
	<b>B. Supply-side Efforts .....</b>	<b>33</b>
	<b>C. Historic DSM Efforts.....</b>	<b>33</b>

	Exhibit 9 - Summary of DSM Activities 2009-2013 .....	34
	<b>D. Evaluation of Alternatives.....</b>	<b>34</b>
	<b>E. Options Chosen – Development of Action Plan .....</b>	<b>35</b>
	i. Future Actions.....	35
	ii. Milestone.....	35
	<b>F. Environmental Effects.....</b>	<b>36</b>
	<b>G. Public Participation .....</b>	<b>36</b>
	Appendix 1 – Detailed DSM Measures Installed .....	37
	Appendix 2 – Beresford Resolution.....	39
<b>III.</b>	<b>Brookings, SD Resource Planning.....</b>	<b>40</b>
	<b>A. City Information .....</b>	<b>40</b>
	Exhibit 1.....	41
	Exhibit 2.....	42
	Exhibit 3.....	43
	Exhibit 4.....	44
	Exhibit 5.....	45
	Exhibit 6.....	46
	Exhibit 7.....	47
	Exhibit 8.....	48
	<b>B. Supply-side Efforts .....</b>	<b>49</b>
	<b>C. Historic DSM Efforts.....</b>	<b>49</b>
	Exhibit 9 - Summary of DSM Activities 2009-2013 .....	50
	<b>D. Evaluation of Alternatives.....</b>	<b>51</b>
	<b>E. Options Chosen – Development of Action Plan .....</b>	<b>51</b>
	i. Future Actions.....	51
	ii. Milestones .....	51
	<b>F. Environmental Effects.....</b>	<b>52</b>
	Appendix 1 – Detailed DSM Measures Installed .....	54
	Appendix 2 – Brookings Resolution.....	63
<b>IV.</b>	<b>Flandreau, SD Resource Planning .....</b>	<b>64</b>
	<b>A. City Information .....</b>	<b>64</b>
	Exhibit 1.....	65
	Exhibit 2.....	66
	Exhibit 3.....	67
	Exhibit 4.....	68
	Exhibit 5.....	69
	Exhibit 6.....	70
	Exhibit 7.....	71
	Exhibit 8.....	72
	<b>B. Supply-side Efforts .....</b>	<b>73</b>
	<b>C. Historic DSM Efforts.....</b>	<b>73</b>
	Exhibit 9 - Summary of DSM Activities 2009-2013 .....	74
	<b>D. Evaluation of Alternatives.....</b>	<b>75</b>
	<b>E. Options Chosen – Development of Action Plan .....</b>	<b>75</b>
	i. Future Actions.....	75
	ii. Milestones .....	75

<b>F. Environmental Effects</b> .....	<b>76</b>
<b>G. Public Participation</b> .....	<b>76</b>
Appendix 1 – Detailed DSM Measures Installed .....	78
Appendix 2 – Flandreau Resolution .....	81
<b>Fort Pierre, SD Resource Planning</b> .....	<b>82</b>
<b>H. City Information</b> .....	<b>82</b>
Exhibit 1 .....	83
Exhibit 2.....	84
Exhibit 3.....	85
Exhibit 4.....	86
Exhibit 5.....	87
Exhibit 6.....	88
Exhibit 7.....	89
Exhibit 8.....	90
<b>I. Supply-side Efforts</b> .....	<b>91</b>
<b>J. Historic DSM Efforts</b> .....	<b>91</b>
Exhibit 9 - Summary of DSM Activities 2009-2013 .....	92
<b>K. Evaluation of Alternatives</b> .....	<b>93</b>
<b>L. Options Chosen – Development of Action Plan</b> .....	<b>93</b>
ii. Milestones .....	93
<b>M. Environmental Effects</b> .....	<b>94</b>
Appendix 1 – Detailed DSM Measures Installed .....	95
Appendix 2 – Fort Pierre Resolution .....	98
<b>V. Hillsboro, ND Resource Planning</b> .....	<b>99</b>
<b>A. City Information</b> .....	<b>99</b>
Exhibit 1 .....	100
Exhibit 2.....	101
Exhibit 3.....	102
Exhibit 4.....	103
Exhibit 5.....	104
Exhibit 6.....	105
Exhibit 7.....	106
Exhibit 8.....	107
<b>B. Supply-side Efforts</b> .....	<b>108</b>
<b>C. Historic DSM Efforts</b> .....	<b>108</b>
Exhibit 9 - Summary of DSM Activities 2009-2013 .....	109
<b>D. Evaluation of Alternatives</b> .....	<b>109</b>
<b>E. Options Chosen – Development of Action Plan</b> .....	<b>110</b>
i. Future Actions.....	110
ii. Milestones .....	110
<b>F. Environmental Effects</b> .....	<b>111</b>
<b>G. Public Participation</b> .....	<b>111</b>
Appendix 1 – Detailed DSM Measures Installed .....	112
Appendix 2 – Hillsboro Resolution .....	114
<b>VI. Pierre, SD Resource Planning</b> .....	<b>115</b>
<b>A. City Information</b> .....	<b>115</b>



	Exhibit 1.....	116
	Exhibit 2.....	117
	Exhibit 3.....	118
	Exhibit 4.....	119
	Exhibit 5.....	120
	Exhibit 6.....	121
	Exhibit 7.....	122
	Exhibit 8.....	123
	<b>B. Supply-side Efforts .....</b>	<b>124</b>
	<b>C. Historic DSM Efforts.....</b>	<b>124</b>
	Exhibit 9 - Summary of DSM Activities 2009-2013 .....	125
	<b>D. Evaluation of Alternatives.....</b>	<b>126</b>
	<b>E. Options Chosen – Development of Action Plan .....</b>	<b>126</b>
	i. Future Actions.....	126
	ii. Milestones .....	126
	<b>F. Environmental Effects.....</b>	<b>127</b>
	<b>G. Public Participation .....</b>	<b>127</b>
	Appendix 1 – Detailed DSM Measures Installed .....	129
	Appendix 2 – Pierre Resolution.....	140
<b>VII.</b>	<b>Vermillion, SD Resource Planning.....</b>	<b>141</b>
	<b>A. City Information .....</b>	<b>141</b>
	Exhibit 1.....	142
	Exhibit 2.....	143
	Exhibit 3.....	144
	Exhibit 4.....	145
	Exhibit 5.....	146
	Exhibit 6.....	147
	Exhibit 7.....	148
	Exhibit 8.....	149
	<b>B. Supply-side Efforts .....</b>	<b>150</b>
	<b>C. Historic DSM Efforts.....</b>	<b>150</b>
	Exhibit 9 - Summary of DSM Activities 2009-2013 .....	151
	<b>D. Evaluation of Alternatives.....</b>	<b>152</b>
	<b>E. Options Chosen – Development of Action Plan .....</b>	<b>152</b>
	i. Future Actions.....	152
	ii. Milestones .....	153
	Appendix 1 – Detailed DSM Measures Installed .....	155
	Appendix 2 – Vermillion Resolution.....	160
<b>VIII.</b>	<b>Watertown, SD Resource Planning.....</b>	<b>161</b>
	<b>A. City Information .....</b>	<b>161</b>
	Exhibit 1.....	162
	Exhibit 3.....	164
	Exhibit 4.....	165
	Exhibit 5.....	166
	Exhibit 6.....	167
	Exhibit 7.....	168

	Exhibit 8.....	169
	<b>B. Supply-side Efforts .....</b>	<b>170</b>
	<b>C. Historic DSM Efforts.....</b>	<b>170</b>
	Exhibit 9 - Summary of DSM Activities 2009-2013 .....	171
	<b>D. Evaluation of Alternatives.....</b>	<b>172</b>
	<b>E. Options Chosen – Development of Action Plan .....</b>	<b>172</b>
	i. Future Actions.....	172
	ii. Milestones .....	173
	<b>F. Environmental Effects.....</b>	<b>173</b>
	<b>G. Public Participation .....</b>	<b>173</b>
<b>IX.</b>	<b>Winner, SD Resource Planning .....</b>	<b>187</b>
	<b>A. City Information .....</b>	<b>187</b>
	Exhibit 1.....	188
	Exhibit 2.....	189
	Exhibit 3.....	190
	Exhibit 4.....	191
	Exhibit 5.....	192
	Exhibit 6.....	193
	Exhibit 7.....	194
	Exhibit 8.....	195
	<b>B. Supply-side Efforts .....</b>	<b>196</b>
	<b>C. Historic DSM Efforts.....</b>	<b>196</b>
	Exhibit 9 - Summary of DSM Activities 2009-2013 .....	197
	<b>D. Evaluation of Alternatives.....</b>	<b>198</b>
	<b>E. Options Chosen – Development of Action Plan .....</b>	<b>198</b>
	i. Future Actions.....	198
	ii. Milestones .....	198
	<b>F. Environmental Effects.....</b>	<b>199</b>
	Appendix 1 – Detailed DSM Measures Installed .....	201
	Appendix 2 – Winner Resolution .....	203
<b>X.</b>	<b>Valley City, ND Resource Planning .....</b>	<b>204</b>
	<b>A. City Information .....</b>	<b>204</b>
	Exhibit 1.....	205
	Exhibit 2.....	206
	Exhibit 3.....	207
	Exhibit 4.....	208
	Exhibit 5.....	209
	Exhibit 6.....	210
	Exhibit 7.....	211
	Exhibit 8.....	212
	<b>B. Supply-side Efforts .....</b>	<b>213</b>
	<b>C. Historic DSM Efforts.....</b>	<b>213</b>
	Exhibit 9 - Summary of DSM Activities 2009-2013 .....	214
	<b>D. Evaluation of Alternatives.....</b>	<b>215</b>
	<b>E. Options Chosen – Development of Action Plan .....</b>	<b>215</b>
	i. Future Actions.....	216

ii. Milestones .....	216
<b>F. Environmental Effects .....</b>	<b>217</b>
<b>G. Public Participation .....</b>	<b>217</b>
Appendix 1 – Detailed DSM Measures Installed .....	218
Appendix 2 – Valley City Resolution .....	222

# **I. MRES Resource Planning**

## **A. Overview**

Missouri River Energy Services (MRES) is a member-based joint-action agency, headquartered in Sioux Falls, South Dakota, with 60 member municipalities in the states of Iowa, Minnesota, North Dakota, and South Dakota. Of its 60 members, 57 are S-1 customers, each of whom receives hydroelectric preference power from the Western Area Power Administration (WAPA). These members purchase power from MRES to meet their needs over and above their WAPA allocations. In February of 2006, all 57 of the MRES S-1 members took action to extend the S-1 agreements from 2030 to 2046.

All of the MRES S-1 members receive hydroelectric preference allocations from WAPA and have purchase power agreements with WAPA to deliver power and energy from those allocations. The member cities purchase all supplemental power from MRES. Because of this contractual arrangement, all the supply-side resource planning is conducted by MRES on behalf of its members.

Conversely, the member cities own and operate their own distribution systems and perform all interfacing with the retail customer. Thus the member cities have the lead responsibility for demand-side and customer efficiency programs.

This document describes the overall process of coordinating the supply-side and demand-side planning into a cohesive, least-cost integrated resource plan.

## **B. Resource Plan Goals**

MRES endeavored to meet the requirements of the applicable state statutes and WAPA standards for integrated resource plans. In the analysis of the scenarios for the capacity expansion modeling, MRES balanced the needs of the members with that of the environment. MRES is committed to maintaining the reliability of power supply, while providing predictability and reasonableness of rates for residential, commercial, and industrial customers. At the same time, MRES is also committed to expansion of its renewable resources and taking an active role in conservation measures. In the analysis of various scenarios, environmental concerns such as emissions were evaluated and also balanced with such considerations as the need for firm base load power and stabilization of energy costs. In the end, the analysis of the various scenarios in the context of these goals resulted in a choice of resource mix that is environmentally responsible, cost-effective, and balanced.

More specifically, the resource planning goals of MRES are to:

### Study Goal 1: Maintain the Adequacy and Reliability of Power Supply.

To meet this goal, load projections were developed for MRES power supply members, including the additional amounts required for MAPP and MISO planning reserves. All existing resources were assumed to remain in operation through at least

2025, with exception of the replacement of the 10 MW of capacity at Moorhead, Minnesota.

According to these criteria, using only existing resources, MRES will not experience a capacity deficit until after 2020. Loads increase in 2016 when MRES assumes all supplemental power requirements for the load of the City of Marshall, Minnesota, as a result of the expiration of Marshall's partial power supply contract with HCPD.

The focus of this study goal was to determine the lowest-cost, reliable plan which optimizes the amount of resources, while meeting capacity requirements. It necessitates the evaluation of a variety of likely options, including baseload, natural gas combined cycle (NGCC), integrated gasification combined cycle (IGCC), combustion turbine (CT) units, wind turbines, and compressed air energy storage (CAES) for the MRES resource mix.

#### Study Goal 2: Keep Members' Wholesale Rates Competitive.

The primary objective of this goal is to minimize the overall long-term power supply costs to MRES member communities. Capacity expansion modeling was utilized to determine the least-cost resource mix (both demand-side and supply-side) under a number of different scenarios. The analysis examined these resource combinations over the 2011 through 2025 timeframe. Because little, if any, capacity is required in many of the scenarios analyzed, a primary focus is on minimizing the overall operations cost.

#### Study Goal 3: Minimize Adverse Socioeconomic and Environmental Effects.

The referenced cases all applied Minnesota Public Utilities Commission-approved environmental externality prices and considered expected costs for mercury and SO<sub>2</sub> allowances when computing the least-cost plan. Various CO<sub>2</sub> emission cost values were explored. Those externalities and emission cost values were calculated using all MRES firm load, not just the Minnesota portion of the MRES loads. Several of the cases and scenarios specifically considered renewable resources, using wind for renewable energy for the purpose of meeting this study goal.

Another specific criterion of this goal was the inclusion of resources to meet the renewable resource objectives established by the MRES board. MRES is committed to achieving the Minnesota RES, supplying 17 percent of the energy served by MRES in Minnesota with renewable energy by the year 2016, increasing to 20 percent by 2020, and 25 percent by 2025. MRES presently meets the renewable energy goals for its Minnesota load and has resources in place to meet it for the next several years. MRES also has adequate resources to supply at least 10 percent of its load in the other states with renewable resources.

A major component of minimizing environmental impacts is to fully implement conservation and DSM. As described earlier, MRES commissioned PA Consulting to perform a DSM potential study, the results of which were incorporated into this resource plan. MRES is undertaking efforts to implement cost-effective DSM measures throughout its membership. In addition, MRES is assisting its Minnesota

members with meeting the full CIP requirement, which includes DSM amounts in addition to what was found feasible by PA Consulting.

Study Goal 4: Enhance the Ability of MRES to Respond to Changes and to Limit Risks.

In meeting this goal, the resource plan discusses and analyzes several of the potential risks MRES could face. These risks, along with several other significant risks related to resource planning, were addressed with several sensitivity analyses.

***C. Load Forecasting***

The MRES load forecasts are based upon a short-term forecast blended into a long-term econometric forecast. Each forecast predicts the aggregate total usage for each member city for each month of the forecast horizon. By subtracting the allocated amounts of WAPA demand and energy, the monthly MRES demand and energy sales to each member is obtained.

The following steps were followed to develop a load forecast for each member municipality.

***i. Develop Long-Term Forecast***

This includes updating the historical files for monthly energy usage and all of the independent variables, forecasting values for independent (explanatory) variables, generating long-term energy models for each member, including any spot load adjustments; and selecting a final long-term energy model for each member.

Annual data for variables believed to be useful in predicting total energy were input into a software package called MetrixND® and regression models were constructed for each city. The city total energy was the dependent variable for each model. Possible independent variables included county census data for the county in which the city is located, weather data from the nearest weather station, national economic statistics, and alternate fuel prices for the region. A number of possible models were tested for each city, and certain criteria were scrutinized in order to find a model that was statistically sound and provided a reasonable expected growth rate. Models were selected primarily based on adjusted R-square, Mean Absolute Percentage Error (MAPE), T-statistics, and Durbin-Watson statistics. The long-term forecast was based on a regression analysis of annual historical data from 1970 through 2012 and created annual energy forecasts through 2040.

***ii. Develop Short-Term Forecast***

Independent of the long-term modeling process, the short-term forecasts were generated using a multiple regression analysis. For the last five years of the analysis, monthly city total energy was the dependent variable for each model.

The primary independent variables included monthly cooling, heating, and total degree days for the weather station representing the city. The logarithmic transformations of the degree days could also be selected as independent variables. At least one weather variable was used in each model. Additionally, no more than two weather variables could be included per model.

Both the one-month and twelve-month lagged energy variables were included in some models, if necessary, to achieve acceptable statistical results. The logarithmic transformations of one-month and twelve-month lags were made available as independent variables. Only one lag variable or transformation thereof could be included per model.

A linear trend variable and the logarithmic transformation of the linear trend were included in some models, if necessary, to achieve acceptable statistical results. Any long-term growth (or negative growth) realized by the cities should be accounted for by including a trend component. A maximum of one trend or transformation of a trend variable was allowed per model.

Monthly binary variables were used to account for the monthly variation in energy sales. Binary variables take the value of one or zero depending upon a condition occurring or not occurring. There were 11 binary variables, with the first binary variable, d1, being equal to 1 for January, and the other ten binary variables being equal to 0 in January. The second binary variable, d2 is equal to 1 for February, and the other ten binary variables being equal to 0 for February, and so on. It is mandatory in regression modeling that one month does not have a binary variable, in order that some base level is set, and subsequent months are either an addition or a subtraction to that base level. Subsequently, the constant is the 12<sup>th</sup> binary variable. In this case, December was the month not represented by a binary variable. All 11 monthly binary variables were forced into each regression model.

### ***iii. Blend Short-Term and Long-Term Forecasts***

The short-term forecasts were used for each member through the remainder of the current year and one additional year. After that year, each member's annual growth rates from the long-term forecasts were used to extend the forecasted energy into a long-term "blended" base forecast that extends to the year 2040.

### ***iv. Calculate MRES vs. WAPA Loads***

Once the forecasted values were obtained, the forecasts for each member were processed by a calculation that splits the energy and demand between WAPA and MRES. The amount of energy and demand that a member receives from WAPA is called the Contract Rate of Delivery (CROD), and is based on a formula specified in the WAPA firm power contracts of each member.

WAPA offers more than one method of defining its allocation of power to their customers. Most of the MRES member cities have selected the "Fixed CROD" method. One S-1 member is using the older "Seasonal X/Y" method. All of the

Minnesota members that purchase power from MRES are using the Fixed CROD method.

Under the Fixed CROD method, each city is assigned a monthly allocation of demand and a monthly allocation of energy from WAPA. Any amount of demand or energy exceeding that monthly allocation is provided by MRES. The allocations are the same from year to year for each city, although they vary each month within the year. Also, the allocations were reduced by approximately 4% in January 2001 to allow WAPA to create new allocations for certain new customers and Native American loads, and were reduced again by 0.25% in January 2006 to create new allocations for additional WAPA customers. One percent reductions in WAPA allocations are also expected in January 2021 and January 2031 and are included in the calculations done for this filing.

Once the WAPA allocations are subtracted from the city loads, the remainder is the amount that MRES supplies to each city.

The load factors of the WAPA allocations do not change from year to year and are different from the load factors of the cities. Because MRES serves the portion of each city's load not supplied by WAPA, the MRES sales also have a different load factor than each city's total load.

**v. *Calculate MRES Generation Requirements***

MRES must also plan to supply reserve capacity for the control areas in which it operates. Currently, MRES is operating in two areas; Mid-Continent Area Power Pool (MAPP), and Midwest Independent System Operators (MISO). MISO has a well-defined method of calculating these requirements, while MAPP has a fairly loose guideline with the details being left to the individual utilities. Additionally, it is anticipated that WAPA will be joining the Southwest Power Pool (SPP) and leaving the MAPP area in the near future. It is assumed that the SPP reserve calculation will closely resemble the MISO reserve calculation. For these reasons, we are using the MISO reserve calculation on our current MAPP load.

MISO rules specify that adequate capacity be designated to meet forecasted loads plus losses and a Planning Reserve Margin (PRM). The load forecast previously described in this document is reduced by a diversity factor since our loads are not expected to peak at the same time as the MISO peak. These values are then scaled up for losses, and a 7.3% PRM is applied. The resulting values represent the total load requirement that MRES is responsible for serving.

In measuring the capacity that accrues towards the requirement, the utility first defines each unit's Installed Capability (ICAP) based on annual tests. MISO then discounts the ICAP value to account for historical or typical forced outage rates to obtain the Unforced Capability (UCAP) rating. Only the UCAP amount may accrue towards meeting the capacity requirement.

A utility designates how much of each unit it wishes to designate in each month, by converting some or all of each unit's UCAP rating to Planning Resource



Credits (PRC). Each PRC is equivalent to 1 MW of UCAP for one month. A utility may avoid designating some units as PRC because of the associated “Must Offer” requirement. Any amount of a unit converted to PRC must be offered each hour in the MISO day-ahead energy market, unless outages or derates are properly documented with MISO.

In this resource plan, MRES is designating as PRC all of its thermal resources that are in the MISO market area, except for some of the older municipal capacity units. Since that amount is inadequate to meet the total capacity required, MRES is also designating a portion of its entitlement to production from LRS Unit 1 located outside of MISO as PRC. A resource external to MISO, such as LRS Unit 1, may be designated as PRC so long as firm transmission to load in MISO is in place, as is the case for LRS Unit 1.

#### ***D. Generation Resources***

MRES, either directly or through its contracts with Western Minnesota, has the following generation capacity:

- Laramie River Station (LRS): 271.8 MW
- LRS Peaking Capacity: 8 MW
- Exira Station: 138.9 MW
- Point Beach Nuclear Plant: 32.8 MW under contract with Wisconsin Public Power Inc. through 2030. 16 MW under contract in 2031 and 2032.
- Watertown Peaking Plant (WPP): 45.8 MW summer, 56.7 MW winter
- Municipal Capacity: 143.7 MW
- Red Rock Hydro Project: Expected to be operational 2017 at 41.9 MW
- Each S-1 member city receives a monthly allocation of WAPA demand and energy, totaling approximately 349 MW (summer seasons) and 307 MW (winter seasons).

In addition to the accredited capacity, MRES has limited unaccredited capacity, as identified in the Resource Plan. MRES continues to receive the output from wind projects located in Worthington, Moorhead, Marshall, and Odin, Minnesota and Rugby, North Dakota totaling over 81 MW.

#### ***E. MRES Resource Planning Development***

This section includes a summary of the capacity expansion study process. Included is a description of the resource options considered in the resource planning combinations, a summary of the risks to be studied in the scenario analysis, and a summary of the generation and transmission resource planning results.

##### ***i. Modeling Method***

MRES utilized Strategist<sup>®</sup> capacity expansion software in the development of the resource plan. This methodology allows base load and peaking resources to compete with renewable energy resources, conservation, and energy efficiency in

developing the resource plan that minimizes costs. Once the optimal resource mix was identified and the Base Case was developed, several scenarios were analyzed to determine the financial risk associated with unexpected events.

***ii. Needs for Additional Capacity and Energy***

The planning process indicates that no additional thermal capacity is needed until 2028. However, this assumes approximately 69.5 MW of DSM and 60 MW of unaccredited renewable resources are being added by then.

***iii. Resource Options Considered***

Many different resource options were considered for the capacity expansion modeling, but only a subset of the options were chosen for detailed study after considering their relative costs and availability. When selecting potential resources for detailed study, consideration was given to several factors:

- Geographic Diversity – It is desirable for MRES resources to be located across a broad geographic area. This minimizes the chance for a single transmission outage to significantly impact the ability to serve MRES loads.
- Reliability – MRES prefers to add resources that are of a proven technology. This minimizes the severity of unexpected forced outages.
- Dispatchability – With the exception of future wind resources, it is assumed that all future generation should be dispatchable. This is essential for MRES to be able to meet its demand on peak days.
- Other risk factors – Other factors affecting the operation of any future resources were considered, such as the price and availability of fuel.

After this screening process, detailed purchase or build options were developed for these standard types of resources:

1. Base load #1: A pulverized coal unit
2. Base load #2: An Integrated Gasification Combined Cycle (IGCC)
3. Peaking: Natural Gas-fired Simple-Cycle Combustion Turbine (CT) units.
4. Intermediate: Natural Gas-fired Combined Cycle (NGCC) units.
5. Renewable #1: 1000 kW Wind Turbines with a 40% assumed plant factor and 15% accreditation installed in 100 MW farm sizes.
6. Renewable #2: 1000 kW Wind Turbines with a 40% assumed plant factor and 0% accreditation installed in 10 MW farm sizes.
7. DSM (Demand Side Management): 69.5 of DSM by 2029 was forced into all of the capacity expansion models.

*iv. Future DSM Activities*

As part of its ongoing efforts, in 2008 MRES commissioned PA Consulting Group to perform a DSM Potential Study. The final report for the study was completed in February 2009. This study determined (1) the Technical Potential (Identify measures that are technically feasible); (2) the Economic Potential (Identify measures that are cost-effective); and (3) the Market Potential (Identify level of uptake that can be expected based on a reasonable level of intervention in the market to overcome adoption barriers).

The Technical Potential estimates the amount of DSM that is technically feasible, ignoring any adoption barriers or economic factors. It considers the energy savings, demand savings, number of eligible units or buildings, technology saturation, technology penetration, and measure lifetime.

The Economic Potential reduces those estimates to account for any measures that would be infeasible due to economic or long payback considerations. Besides the factors used for the Technical Potential, it considers incremental cost, the retail values of energy, and the participant's benefit-cost ratio for each measure.

Finally, the Market Potential further reduces the estimates to account for certain adoption barriers. It also considers a market barrier level (based on a diffusion curve for adoption of new technologies), free ridership levels, and a degradation of savings rate.

Once the DSM programs were screened through the above process, MRES staff used the results of the PA consulting analysis to group the DSM programs into eleven DSM Portfolios. This step reduced the volume to a manageable number to be evaluated in this analysis. Similar programs were grouped together, with the resulting portfolios and the potential MW savings by 2029 listed below:

• Commercial HVAC	4.7 MW
• Commercial Lighting	20.2 MW
• Commercial Motors	.2 MW
• Commercial Refrigeration	3.8 MW
• Commercial Water Heaters	.1 MW
• Commercial Cooking	1.1 MW
• Residential HVAC	5.9 MW
• Residential Lighting	10.5 MW
• Residential Water Heaters	.1 MW
• Residential Appliances	1.9 MW
• Direct Load Control	21 MW
<b>TOTAL</b>	<b>69.5 MW</b>

These portfolios were forced into the capacity expansion analysis. As a result, the model built less generating capacity, purchased less energy on the market, and

generated less energy. The model also estimated the costs of administering the DSM programs, and providing incentives to customers.

**v. *Renewable Energy Resources***

MRES has existing renewable energy resources and is planning renewable resource additions as an integral part of the resource planning process. The expansion of renewable resources in the MRES portfolio is important to meeting its mission to provide environmentally responsible energy and to make a good faith effort in meeting Minnesota's Renewable Energy Standard (RES), North and South Dakota's Renewable Energy Objectives (REO), and Iowa's Alternative Energy Purchase (AEP). MRES continues to receive the output from wind projects located in Worthington, Moorhead, Marshall, and Odin, Minnesota, and Rugby, North Dakota totaling over 81 MW. In addition to this existing wind generation, MRES plans to commission 41.9 MW at the Red Rock Hydro Project by 2017, and construct or contract an additional 60 MW of wind generation by 2026 to comply with the state requirements mentioned above. These future wind and hydro installations were forced into the model as a minimum, with the model being able to voluntarily add more if found to be economical.

**vi. *Emission Costing***

MRES used the emission externality costs for PM<sub>10</sub>, CO, NO<sub>x</sub>, and lead as approved by the Minnesota Public Utilities Commission (PUC) for each case for all new resources. Because all current and future fossil-fuel resources of MRES are located outside of Minnesota, the costs were based on the Minnesota environmental externality values as published by the Minnesota PUC for resources within 200 miles of the state, inflation adjusted. The published Minnesota CO<sub>2</sub> externality price was zero for such resources, but a CO<sub>2</sub> cost of \$10 beginning 2017 was assumed.

The cost of SO<sub>2</sub> emission allowances were included in each Strategist case based on estimated market price for allowances. This cost was inflated and applied to the tons of SO<sub>2</sub> emissions produced by any new resources included in each case.

The potential cost of mercury control was also assessed. It was assumed that emission limits or allowance pricing would apply in the future for mercury emissions. This cost was applied to the pounds of mercury emissions produced by any new resources included in each case.

**F. *Resource Planning Results***

After accounting for all of the details listed above, Strategist capacity expansion software modeling indicated that the preferred expansion plan for MRES is 41.9 MW of Hydro (Red Rock Hydro) in 2017, 60 MW of wind by 2026, and 69.5 MW of DSM by 2029. Multiple alternative scenarios were also evaluated to consider various effects, such as low or high load forecasts, or low or high natural gas prices.

## ***G. Implementation***

As a wholesale power supplier, it is the responsibility of MRES to provide all supplemental power supply to MRES S-1 member utilities. Prior to 2006, energy efficiency programs were the responsibility of each individual MRES member since MRES did not have a direct relationship with its members' retail customers and since energy efficiency programs are implemented at the retail level. In an effort to bridge the traditional gap between MRES as a wholesale supplier, and its members as retail DSM providers, the MRES Board of Directors began efforts in early 2006 to develop a program that would strongly encourage additional DSM, would assist and support member implementation of DSM, and would integrate MRES and member efforts. An overview of the DSM progress of MRES and its members is described below.

### ***i. DSM Task Force***

In 2006, the MRES Board of Directors created a DSM Task Force to chart a course toward developing and implementing DSM programs to be provided to all the member communities. The Task Force was comprised of 14 representatives from member communities, including 2 members of the MRES Board of Directors. The purpose of the Task Force was to evaluate and recommend energy efficiency and demand management strategies that would allow MRES to achieve the DSM goals identified. The Task Force also determined the respective roles of MRES and its members, and developed implementation and marketing strategies for the rollout of DSM programs. As the result of the 12 Task Force meetings, MRES developed a portfolio of energy efficiency programs called Bright Energy Solutions<sup>®</sup> and developed a Coordinated Demand Response program called Get the Load Down<sup>SM</sup>. Both of those programs continue to be enhanced and expanded by MRES over time.

### ***ii. Bright Energy Solutions***

One of the recommendations of the DSM Task Force was for MRES to create a brand that encompasses all of the DSM program offerings to the member communities. MRES created Bright Energy Solutions (BES) to assist the members in implementing DSM activities, to provide consistency in programs throughout the membership, and to make programs easily identifiable to customers and regional trade allies.

MRES conducted further study work to design individual measures and programs to be offered through Bright Energy Solutions. Bright Energy Solutions is currently offered to commercial, industrial and residential customers in 58 participating MRES member communities. The Bright Energy Solutions program offers a portfolio of energy efficiency cash incentive programs that will help the member's customers reduce their electric energy costs and operate more efficiently. At the same time, the savings provide MRES with a very cost effective power supply resource.

## ***H. BES Programs Designed to Meet Goals***

Under the Bright Energy Solutions banner, MRES member utilities began to offer a limited number of energy efficiency incentives in January 2008, through our member utilities, to commercial and industrial customers. Several residential programs were added in 2009. Since then, the BES offerings have been expanded for all customer classes. The 2014 BES incentive offerings are as follows:

### **Residential BES Programs:**

- Appliance Turn-in Program
- ENERGY STAR® Products (7 ENERGY STAR appliances/products)
- Residential Heating and Cooling (11 HVAC measures)
- Residential Lighting

### **Commercial and Industrial BES Programs:**

- Commercial Refrigeration
- Compressed Air System Efficiency
- Custom Incentives for Businesses
- Food Service for Businesses
- Heating and Cooling for Businesses
- Lighting - New Construction
- Lighting Retrofits
- New Construction Design Review
- Pumps and VFDs for Businesses
- Specialty Measures for Businesses
- Targeted Audits

The targeted audience for the BES programs is primarily business customers since commercial and industrial electrical consumption makes up approximately 70 percent of the MRES members' retail sales. However, it is the goal of the BES program to ensure that all customers have an opportunity to save energy and money.

### ***i. BES Savings Results***

The following tables show the BES savings results from inception through 2013:

<b>Year</b>	<b>Incentives Paid</b>	<b>kWh Savings</b>	<b>kW Savings</b>
2008	\$ 485,040.60	6,237,775	1,595
2009	\$ 1,242,842.41	16,737,462	3,762
2010	\$ 1,809,139.99	26,494,210	5,252
2011	\$ 1,888,249.10	29,824,594	6,077
2012	\$ 1,617,411.87	24,325,963	5,190
2013	\$ 1,918,485.57	28,176,376	6,053
<b>Totals</b>	<b>\$ 8,961,169.54</b>	<b>131,796,380</b>	<b>27,928</b>

In addition to helping MRES meet its Resource Plan goals, the expansion of the BES program has served to help the MRES Minnesota and Iowa members meet their state energy savings goals as well. Both Minnesota and Iowa strongly encourage energy efficiency through the adoption of state goals for each electric utility. The 2014 goal for MRES Minnesota members is to save 1.5 percent of average retail sales. The 2014 goal for MRES Iowa members is to save 1.0 percent of average retail sales. Although the states of North Dakota and South Dakota do not have formal energy saving goals, the MRES members in those states are very actively promoting the BES programs to ensure that their customers have an equal opportunity to save energy and money.

## *ii. Future Strategies for Savings*

The Bright Energy Solutions program is now in its seventh year of implementation. MRES is finding that as the most cost-effective and most universally applicable efficiency projects (i.e. lighting) are being completed, it becomes increasingly harder to get energy savings. MRES is continually looking for new marketing strategies, new implementation methods, and new technologies to encourage more participation and move projects to fruition. In 2012 and 2013, MRES used targeted grocery store audits and lighting audits to personally connect with customers and to make the implementation of energy efficiency projects as easy as possible.

In 2014, two pilot projects are underway to engage customers to achieve deeper savings. Those pilot projects are:

- Retro-Commissioning (RCx) of Control Systems
- ENERGY STAR Energy Team Program

The RCx Program is a cost-effective way to correct problems and optimize a facility's direct digital control (DDC) or process control system. Many large customers have HVAC, lighting, and process controls that were installed, and likely working well when the system was new. Over time, as equipment is changed out, when new equipment is added, and/or when there are staff changes, the control system is not always updated to accommodate the changes. The recommendations that come out of an RCx study are often no-cost or low-cost operational and maintenance solutions that can result in significant demand and energy and cost savings. Typical savings results on RCx projects done by others are in the 10% to 30% range.

The ENERGY STAR Energy Teams Program strives for superior energy management by providing a set of tools and resources to help customers improve their energy and financial performance and to recognize their organization for its accomplishments. An energy team made up of representatives from management, finance, plant operations, and maintenance will be formed at select customer facilities. Trained MRES staff will provide a leadership role and guidance at monthly or bi-monthly customer meetings. The energy team will assess and benchmark past performance, set goals, create an action plan, and identify

resources to implement the action plan. After implementation, the team will verify and evaluate the results and progress, recognize accomplishments, and start the process over again for a 360 degree review. ENERGY STAR reports that savings of 5 percent to 10 percent are common among participants.

## ***I. Cost-Effectiveness of BES Programs***

As part of the development of the Bright Energy Solutions program, a number of steps were taken to analyze the costs, benefits, and applicability of the programs, both from the MRES perspective and the member utility perspective. That evaluation is described below.

### ***i. Economic Analysis of Energy Efficiency***

As MRES started developing DSM programs and making decisions about which efficiency measures to rebate and where to set rebate levels, it became apparent that more in-depth economic analysis was needed. MRES worked with consultant Morgan Marketing Partners for guidance in the development of the DSM programs and rebates. The incentive levels set for the measures covered by the program were assessed through a cost-effectiveness analysis using DSMore software, a model that utilizes the Total Resource Cost (TRC), Utility Cost Test (UCT), Ratepayer Impact Measure (RIM), Societal, and Participant test. The cost-effectiveness tests take into account for the energy and demand savings, associated avoided costs, net benefits to MRES members, incremental or installed costs, and the program costs.

The test that is the most applicable, and most important to MRES in determining cost-effectiveness is the UCT. This test compares the costs of DSM to the benefits of the program from the utility perspective. The costs of DSM include the incentives that are paid to the customer, the administrative costs, and the marketing or promotional costs. For MRES, the benefit of DSM is a reduction in future costs to MRES. By achieving savings through DSM, MRES has the opportunity to avoid purchases on the open market virtually every day. MRES chose to offer the energy efficiency measures that were found to be cost-effective using the UCT test. The results of all other tests were reviewed and considered as well. If a measure passed the UCT test, but did not pass one or more of the other Standard Practice Manual tests, those measures were given particular scrutiny to determine whether the measure should be offered by MRES. Factors that were considered included the cost to the participant, the benefits to the participant, the value of environmental benefits, and possible rate impacts to non-participants.

The following is a list of the TRC and UCT test results for different categories of DSM programs. Note that values over 1.0 indicate a passing test:



	UCT	TRC
Commercial HVAC	3.68	1.90
Commercial Lighting	4.00	2.16
Commercial New Construction lighting	5.71	2.21
Commercial Portfolio	5.22	2.50
Custom	7.32	3.48
Direct Install	1.03	0.89
Drives	8.00	3.53
Energy Star Products	1.15	0.40
Food Services	2.48	0.58
Other	7.08	0.22
Res Appliance Turn-In	5.18	14.50
Residential HVAC	2.16	1.06
Residential Lighting	6.08	4.54
Residential Portfolio	2.82	1.43
Specialty	7.68	9.71

**ii. Member Program Selection**

MRES offers the menu of Bright Energy Solutions programs to all S-1 members. Members may choose to offer any or all of the programs based on the demographics and needs of their customer base and their own preferences. MRES provides all of the incentives offered through the programs as a reimbursement to the member utility. MRES also provides marketing materials that each member can customize for their own use, as well as technical assistance and field inspection assistance when the incentive is in excess of \$10,000 per retail customer for a given project. MRES provides a tracking system to track the savings goals of each member, the incentive amounts paid, and kW and kWh savings from all rebate applications. The information is available to members in real-time through a web portal. MRES members must answer customer questions, review applications, conduct field inspections for rebate applications under \$10,000, and issue checks for rebates. Below is the current menu of program offerings, along with the incentives paid by MRES:

**BRIGHT ENERGY SOLUTIONS®  
INCENTIVE SCHEDULE A - Effective 2014-0101**

Measures/Incentives/Savings	Incentive/ Measure
<b>Lighting Retrofits</b>	
<b>T-8s with Electronic Ballasts</b>	
T-8 4ft 4 lamp (retrofit install only)	\$ 10.00
T-8 4ft 3 lamp (retrofit install only)	\$ 9.00
T-8 4ft 2 lamp (retrofit install only)	\$ 5.00
T-8 4ft 1 lamp (retrofit install only)	\$ 4.00
T-8 2ft 4 lamp (retrofit install only)	\$ 8.00
T-8 2ft 3 lamp (retrofit install only)	\$ 7.00

T-8 2ft 2 lamp (retrofit install only)	\$	6.00
T-8 2ft 1 lamp (retrofit install only)	\$	5.00
T-8 8ft 1 lamp (retrofit install only)	\$	7.00
T-8 8ft 2 lamp (retrofit install only)	\$	9.00
T-8 HO 8 ft 1 Lamp (retrofit install only)	\$	12.00
T-8 HO 8 ft 2 Lamp (retrofit install only)	\$	16.00
T-8 4ft 2 lamp with reflector/delamping replacing T12 4ft 4 lamp	\$	25.00
T-8 4ft 2 lamp with reflector/delamping replacing T12 8 ft 2 lamp	\$	18.00
T-8 4ft 2 lamp with reflector/delamping replacing T12 4ft 3 lamp	\$	18.00
T-8 4ft 3 lamp with reflector/delamping replacing T12 4ft 4 lamp	\$	18.00
T-8 4ft 1 lamp with reflector/delamping replacing T12 4 ft 2 lamp	\$	10.00
T-8 4ft 2 lamp replacing T12HO 8ft 1-lamp	\$	20.00
T-8 4ft 4-lamp replacing T12HO 8ft 2-lamp	\$	30.00
<b>High Performance (Super) T8 Lamps and Ballasts</b>		
T8 High Performance, 4 ft 1 lamp-F32T8HP 32W, 1 ELEC HP RLO	\$	6.00
T8 High Performance, 4 ft 2 lamp-F32T8HP 32W, 1-ELEC HP RLO	\$	7.00
T8 High Performance, 4 ft 3 lamp-F32T8HP 32W, 1-ELEC HP RLO	\$	12.00
T8 High Performance, 4 ft 4 lamp-F32T8HP 32W, 1-ELEC HP RLO	\$	14.00
<b>Reduced Wattage T8 Systems (CEE qualified only)</b>		
Low Watt T8 4ft 1 lamp of 28W or less	\$	7.00
Low Watt T8 4ft 2 lamp of 28W or less	\$	9.00
Low Watt T8 4ft 3 lamp of 28W or less	\$	13.50
Low Watt T8 4ft 4 lamp of 28W or less	\$	18.00
Low Watt T8 4 ft 1 lamp with reflector/delamping replacing T12 4 ft 2 lamp	\$	13.00
Low Watt T8 4 ft 2 lamp with reflector/delamping replacing T12 4 ft 3 lamp	\$	20.00
Low Watt T8 4 ft 2 lamp with reflector/delamping replacing T12 4 ft 4 lamp	\$	27.00
Low Watt T8 4 ft 3 lamp with reflector/delamping replacing T12 4 ft 4 lamp	\$	21.00
Low Watt T8 4 ft 2 lamp with reflector/delamping replacing T12 8 ft 2 lamp	\$	20.00
<b>Low Wattage Replacement Lamps</b>		
Low Watt T8 lamps - per lamp	\$	1.00
Low Watt Relamp 54W 8ft T-8 - per lamp	\$	1.00
Low Watt T5HO 4ft lamps - per lamp	\$	1.25
<b>High-Bay T8 Fluorescent Fixtures</b>		
High Bay Fluorescent 3L F32T8	\$	45.00
High Bay Fluorescent 4L F32T8 Replace 250W HID	\$	70.00
High Bay Fluorescent 6L F32T8 Replace 400 W	\$	85.00
High Bay Fluorescent 6L F32T8 Replace 750 W	\$	120.00
High Bay Fluorescent 8L F32T8 - Replaces 400W	\$	70.00
High Bay Fluorescent 8L F32T8 - Replaces 750W	\$	100.00
High Bay Fluorescent 10L F32T8 - replace 1000W HID	\$	150.00
High Bay Fluorescent 12L F32T8 - replace 1000W HID	\$	140.00
High Bay Fluorescent 16L F32T8 - Double 8L fixture replace 1000W HID	\$	130.00
<b>T5 with Electronic Ballast</b>		
1 Lamp T-5 with Elec Ballast replacing T-12	\$	7.00
2 Lamp T-5 with Elec Ballast replacing T-12	\$	9.00

<b>High-Bay T5 Fluorescent Fixtures</b>	
High Bay 2L T5HO Replace 150-175 W HID	\$ 60.00
High Bay 2L T5HO Replace 250W HID	\$ 75.00
High Bay 3L T5HO Replace 250 W	\$ 70.00
High Bay 4L T5HO Replace 400 W	\$ 90.00
High Bay 6L T5HO Replace 400 W	\$ 70.00
High Bay 6L T5HO Replace 750 W	\$ 125.00
High Bay 8L T5HO Replace 750 W	\$ 110.00
High Bay 8L T5HO Replace 1000 W	\$ 200.00
High Bay 10L T5HO Replace 1000W	\$ 175.00
High Bay 12L T5HO or 6L double fixture replace 1000W HID	\$ 150.00
<b>Compact Fluorescent Fixtures:</b>	
CFL Fixture- All Wattages	\$ 18.00
Screw-In CFL 9W-42W	\$ 1.50
CFL Reflector Floodlights	\$ 4.00
<b>Metal Halide Fixtures</b>	
250W Pulse Start Metal Halide replacing 400W	\$ -
320W Pulse Start Metal Halide	\$ -
750W Pulse Start Metal Halide	\$ -
Ceramic Metal Halide 2W Electronic Ballast replacing 100W	\$ -
Ceramic Metal Halide 39W Electronic Ballast replacing 150W	\$ -
Ceramic Metal Halide 150W Electronic Ballast replacing 500W	\$ -
<b>LED Signs/Signals/Technologies</b>	
LED Exit Signs Electronic Fixtures (Retrofit Only)	\$ 12.00
LED Auto Traffic Signals	\$ 25.00
LED Pedestrian Signals	\$ 22.00
LED Reach-in refrigerated case lighting - per door	\$ 25.00
LED Recessed Downlights (indoor only)	\$ 25.00
LED screw-in replacement lamps $\geq$ 11 watts - per lamp	\$ 15.00
LED screw-in replacement lamps < 11 watts - per lamp	\$ 6.00
LED horizontal case lighting - per foot	\$ 5.00
<b>Controls and Other Efficient Lighting Technologies</b>	
Occupancy Sensors under 500 W	\$ 20.00
Occupancy Sensors over 500 W	\$ 40.00
High bay occupancy sensors for T8 or T5 high bays	\$ 10.00
Central Lighting Control - per watt controlled	\$ .04/watt
Switching Controls for Multilevel Lighting - per watt controlled	\$ 0.04/watt
Daylight Sensor controls - per watt controlled	\$ 0.13/watt
<b>Lighting in New Construction</b>	
<b>High-Bay T8 Fluorescent Fixtures</b>	
High Bay Fluorescent 3L F32T8	\$ 20.00
High Bay Fluorescent 4L F32T8	\$ 25.00
High Bay Fluorescent 6L F32T8	\$ 50.00
High Bay Fluorescent 8L F32T8	\$ 70.00
High Bay Fluorescent 10L F32T8	\$ 100.00
High Bay Fluorescent 12L F32T8	\$ 115.00

<b>High-Bay T5 Fluorescent Fixtures</b>	
High Bay 2L T5HO	\$ 25.00
High Bay 3L T5HO	\$ 25.00
High Bay 4L T5HO	\$ 50.00
High Bay 6L T5HO	\$ 70.00
High Bay 8L T5HO	\$ 90.00
High Bay 10L T5HO	\$ 110.00
<b>Controls and Other Efficient Lighting Technologies</b>	
High bay occupancy sensors for T8 or T5 high bays	\$ 10.00
<b>High Performance (Super) T8 Lamps and Ballasts</b>	
T8 High Performance, 4 ft 1 lamp-F32T8HP 32W, 1 ELEC HP RLO	\$ 3.00
T8 High Performance, 4 ft 2 lamp-F32T8HP 32W, 1-ELEC HP RLO	\$ 4.00
T8 High Performance, 4 ft 3 lamp-F32T8HP 32W, 1-ELEC HP RLO	\$ 5.00
T8 High Performance, 4 ft 4 lamp-F32T8HP 32W, 1-ELEC HP RLO	\$ 6.00
<b>Reduced Wattage T8 Systems (CEE qualified only)</b>	
Low Watt HPT8 4ft 1 lamp of 28W or less	\$ 3.00
Low Watt HPT8 4ft 2 lamp of 28W or less	\$ 4.00
Low Watt HPT8 4ft 3 lamp of 28W or less	\$ 7.00
Low Watt HPT8 4ft 4 lamp of 28W or less	\$ 9.00
<b>LED Technologies</b>	
LED Recessed Downlights (indoor only)	\$ 25.00
LED Reach-in refrigerated case lighting - per door	\$ 25.00
Occupancy Sensor controlling LED refrigerated case lighting - per door	\$ 5.00
LED horizontal case lighting - per foot	\$ 5.00
LED screw-in replacement lamps $\geq$ 11 watts - per lamp	\$ 15.00
LED screw-in replacement lamps $<$ 11 watts - per lamp	\$ 6.00
<b>HVAC/Cooling Technologies</b>	
<b>Packaged Terminal Air Conditioners (PTAC)</b>	
High Eff PTAC Electric - all sizes	\$ 45/ton
<b>Air Conditioning Systems - split systems</b>	
AC less than 65 kBTU 5.42 tons - 1 phase	\$ 50/ton
AC less than 65 kBTU 5.42 tons - 3 phase	\$ 50/ton
AC less than 65 kBTU of 18.0 SEER or greater	\$ 90/ton
AC 65 to 135 kBtu 5.42 to 11.25 tons	\$ 50/ton
AC 135 to 239 KBTU 11.25 to 20 tons	\$ 50/ton
AC 240 to 759 kBTU 20 to 63.3 tons	\$ 50/ton
AC more than 760 kBTU 63.3 tons	\$ 50/ton
Mini-Split Ductless Air Conditioners any size	\$ 100.00
<b>Air Conditioning Systems - single packaged systems</b>	
AC less than 65 kBTU 5.42 tons - 1 phase	\$ 50/ton
AC less than 65 kBTU 5.42 tons - 3 phase	\$ 50/ton
AC less than 65 kBTU 5.42 tons of 18 SEER or greater	\$ 90/ton
AC 65 to 135 kBtu 5.42 to 11.25 tons	\$ 50/ton

AC 135 to 239 KBTU 11.25 to 20 tons	\$ 50/ton
AC 240 to 759 kBTU 20 to 63.3 tons	\$ 50/ton
AC more than 760 kBTU 63.3 tons	\$ 50/ton
<b>Split System Air Source Heat Pumps</b>	
HVAC_HP 65,000 1 Ph	\$ 50/ton
HVAC HP 65,000 of 18.0 SEER or greater	\$ 90/ton
HVAC_HP 65,000 3 Ph	\$ 50/ton
HVAC_HP 65,000 - 135,000	\$ 50/ton
HVAC_HP 135,000 - 240,000	\$ 50/ton
HVAC_HP 240,000	\$ 50/ton
Mini-Split Ductless Air Source Heat Pump any size	\$ 200.00
<b>Air Source Heat Pumps - single packaged systems</b>	
HVAC_HP 65,000 1 Ph	\$ 50/ton
HVAC HP 65,000 of 18.0 SEER or greater	\$ 90/ton
HVAC_HP 65,000 3 Ph	\$ 50/ton
HVAC_HP 65,000 - 135,000	\$ 50/ton
HVAC_HP 135,000 - 240,000	\$ 50/ton
HVAC_HP 240,000 Single Packaged	\$ 35/ton
<b>Ground Source Heat Pumps</b>	
Ground Source HP Closed Loop - various types & sizes	\$ 200/ton
Add a desuperheater	\$ 250.00
<b>Energy Star Window and Wall Air Conditioners</b>	
ES Window or wall AC under 14,000 Btu hr	\$ 35.00
ES Window or wall AC over 14,000 Btu hr	\$ 70.00
<b>Heat Pump Water Heaters</b>	
HP Water Heater Energy Star qualified - residential style	\$ 300.00
<b>Chillers</b>	
High Eff Air-Cooled Chiller - all sizes, VFD or no VFD	\$ 40/ton
Centrifugal Water Cooled Chillers <150 ton, VFD or no VFD	\$ 30/ton
Centrifugal Water Cooled Chillers 150-300 ton, VFD or no VFD	\$ 30/ton
Centrifugal Water Cooled Chillers >300 ton, VFD or no VFD	\$ 30/ton
Scroll or Screw Water Cooled Chillers <150 ton, VFD or no VFD	\$ 30/ton
Scroll or Screw Water Cooled Chillers 150-300 ton, VFD or no VFD	\$ 30/ton
Scroll or Screw Water Cooled Chillers >300 ton, VFD or no VFD	\$ 30/ton
<b>Chilled Water Resets</b>	
Chilled Water Reset Air Cooled 0-100 tons	\$ 6/ton
Chilled Water Reset Air Cooled 100-200 tons	\$ 5/ton
Chilled Water Reset Air Cooled 200-300 tons	\$ 3.50/ton
Chilled Water Reset Air Cooled 300-400 tons	\$ 2.50/ton
Chilled Water Reset Air Cooled 400-500 tons	\$ 2/ton
Chilled Water Reset Water Cooled 0-1000 tons	\$ 1/ton
Chilled Water Reset Water Cooled 1000-2000 tons	\$ 0.50/ton
Chilled Water Reset Water Cooled 2000-3000 tons	\$ 0.35/ton

<b>Other Energy Efficient Cooling Technologies</b>	
ECM in residential style furnace/air handler/fan coil	\$ 150.00
Demand controlled ventilation (carbon dioxide sensors)	\$ 35/1000 sq.ft.
Guest room energy management - PTACs	\$ 35/room
Guest room energy management - PTHPs	\$ 30/room
Setback/Programmable Thermostat	\$ 50.00
Window Film	\$ .40/sq.ft.
Energy recovery ventilators (ERVs)	\$ 0.60/cfm
Rooftop Unit (RTU) Optimizers	\$ 185/ton
<b>Pumps/Variable Frequency Drives</b>	
<b>Pumps</b>	
Pumps HP 1.5	\$ 60.00
Pumps HP 2	\$ 70.00
Pumps HP 3	\$ 100.00
Pumps HP 5	\$ 100.00
Pumps HP 7,5	\$ 200.00
Pumps HP 10	\$ 260.00
Pumps HP 15	\$ 300.00
Pumps HP 20	\$ 400.00
<b>Variable Frequency Drives (VFDs)</b>	
VFDs on HVAC fans & pumps, process pumps all sizes	\$ 40/hp
VFDs on new air compressors	\$ 35/hp
<b>Compressed Air Efficiency</b>	
Compressed Air Leak Detection Survey	50% of cost of audit up to \$5,000
VFDs on new air compressors	\$ 35/hp
Engineered Nozzles for compressed air	\$ 20.00
No-air loss drains - each	\$160.00
Cycling refrigerated dryers - per100 cfm	\$75.00
Dew point demand controls - per 100 cfm	\$150.00
Mist eliminators - per HP	\$4.00
<b>Specialty/Misc. Equipment</b>	
Commercial Clothes Washers - electric water heater	\$ 50.00
Residential ES Dishwasher in commercial building	\$ 25.00
ENERGY STAR Ceiling Fan with Light Kit	\$ 45.00
Plug Load Occupancy Sensors Document Stations	\$ 25.00
Computer Network Power Management - per PC	\$ 15.00
<b>Food Service &amp; Commercial Refrigeration Equipment</b>	
ES Commercial Solid Door Refrigerators less than 15 sqft.	\$ 50.00
ES Commercial Solid Door Refrigerators 15-30 sqft.	\$ 100.00
ES Commercial Solid Door Refrigerators 30-50 sqft.	\$ 150.00
ES Commercial Solid Door Refrigerators greater than 50 sqft.	\$ 250.00
ES Commercial Glass Door Refrigerators less than 15 sqft.	\$ 50.00
ES Commercial Glass Door Refrigerators 15-30 sqft.	\$ 100.00
ES Commercial Glass Door Refrigerators 30-50 sqft.	\$ 150.00
ES Commercial Glass Door Refrigerators greater than 50 sqft.	\$ 250.00

ES Commercial Solid Door Freezers less than 15 sqft.	\$ 50.00
ES Commercial Solid Door Freezers 15-30 sqft.	\$ 100.00
ES Commercial Solid Door Freezers 30-50 sqft.	\$ 150.00
ES Commercial Solid Door Freezers greater than 50 sqft.	\$ 250.00
ES Commercial Glass Door Freezers less than 15 sqft.	\$ 50.00
ES Commercial Glass Door Freezers 15-30 sqft.	\$ 100.00
ES Commercial Glass Door Freezers 30-50 sqft.	\$ 150.00
ES Commercial Glass Door Freezers greater than 50 sqft.	\$ 250.00
ES Ice Machines less than 500 lbs per day	\$ 200.00
ES Ice Machines 500-1000 lbs per day	\$ 300.00
ES Ice Machines greater than 1000 lbs per day	\$ 600.00
Commercial Dishwasher - under counter type	\$ 90 - 250
Commercial Dishwasher - door type	\$ 175 - 500
Commercial Dishwasher - single tank conveyer	\$ 250 - 600
Commercial Dishwasher - multi-tank conveyer	\$ 400-1000
ES 3 Pan Steam Cooker	\$ 300.00
ES 4 Pan Steam Cooker	\$ 400.00
ES 5 Pan Steam Cooker	\$ 500.00
ES 6 Pan Steam Cooker	\$ 600.00
ES Hot Holding Cabinets - Full Size Cabinets	\$ 400.00
ES Holding Cabinets - Three Quarter Size	\$ 300.00
ES Holding Cabinets - Half Size Cabinets	\$ 200.00
ES Commercial Fryers	\$ 500.00
ES Commercial Griddles	\$ 600.00
ES Convection Ovens	\$ 200.00
ES Combination Ovens	\$ 1,000.00
LED reach-in refrigerated case lighting	\$ 25.00
ECM evaporator fan motors in coolers and freezers	\$ 60.00
Kitchen hood temperature & optical control	\$ 150.00
Bonus for make-up air horsepower controlled	\$ 60.00
Kitchen hood temperature control only	\$ 60.00
Bonus for make-up air horsepower controlled	\$ 25.00
Low heat freezer doors - per door	\$ 25.00
ECM evaporator fan motors for walk-in freezers and coolers - per motor	\$ 60.00
ECM fan motors for compressors and condensers - per motor	\$ 20.00
ECM fan motors for reach-in cases - per motor	\$ 20.00
Reach-in cooler/freezer cases with doors replacing multi-deck cases	\$ 30.00/LF
No-mullion reach-in cooler cases - per door	\$ 15.00
Occupancy sensor controlling LED case lighting - per door	\$ 5.00
Vending Equipment Controller	\$ 50.00
Anti Sweat Heater Controls - Coolers & Freezers - per door	\$ 30.00
<b>Custom/Custom Bonus/Intensive Audit/New Construction</b>	
Custom Base Incentive	\$ 300/kW
Custom Bonus Level 1	\$0.01/kWh
Custom Engineering Audit	50% of audit up to \$5,000
Targeted Audit Program	50% -100% of cost of audit
C & I New Construction Program	Incentives based on Custom Program
Request for Proposals (RFP)	Incentives vary based on RFP

<b>Residential Programs</b>	
<b>Residential HVAC</b>	
Ground Source HP Closed Loop Residential	\$ 200/ton
Add a desuperheater	\$ 250.00
ECM motor in air handler/fan coil	\$ 150.00
ECM motor in natural gas furnace	\$ 150.00
Air Source Heat Pump	\$ 250.00
Air Source Heat Pump of 18.0 SEER or greater	\$ 350.00
Mini-Split Ductless Air Source Heat Pump	\$ 200.00
Central Air Conditioner	\$ 100.00
Central Air Conditioner of 18.0 SEER or greater	\$ 225.00
Mini-Split Ductless Air Conditioner	\$ 100.00
Heat Pump Water Heater	\$ 300.00
Programmable thermostat	\$ 25.00
<b>Appliance Turn-in Program</b>	
Appliance Turn-in Refrigerator	\$ 35.00
Appliance Turn-in Freezer	\$ 35.00
Appliance Turn-in Room AC	\$ 25.00
<b>Energy Star Products</b>	
LED Holiday	\$ 3.50
Residential CFL - all wattages	\$ 1.50
Residential CFL Reflector Floodlights	\$ 1.50
ES Room AC	\$ 35.00
ES Dehumidifier	\$ 10.00
ES Dishwasher	\$ 25.00
ES Clothes Washers	\$ 50.00
ES Refrigerator plus recycling old unit	\$ 50.00
ES Ceiling fan with light kit	\$ 25.00

### *iii. Calculation of Savings*

The savings calculations for all prescriptive rebates under Bright Energy Solutions are based on the algorithms provided by the Minnesota Division of Energy Resources (MN DER) in its Technical Resource Manual (TRM). If the BES program provides prescriptive rebates for measures that are not included in the MN TRM, those savings are calculated by consultant Franklin Energy of Port Washington, Wisconsin. Franklin Energy uses engineering calculations and the deemed savings from other state TRMs to determine savings. For custom rebates, the kW and kWh savings are determined using engineering calculations. Customers and contractors submit their projects to MRES for review, including estimated kW and kWh savings. MRES staff, and/or its consultant, reviews these projects and savings estimates and determines the level of incentive to be awarded. For projects where savings of 1 million kWhs or more are anticipated, pre and post-metering is required. This review of the savings analysis helps assure that MRES funds are being cost effectively used to promote efficiency.



**iv. Environmental Benefits**

In addition to helping customers reduce and manage their energy costs, the Bright Energy Solutions programs provide other societal benefits. These benefits include reduced emissions of CO<sub>2</sub>, carbon monoxide, SO<sub>x</sub>, NO<sub>x</sub>, and mercury. The estimated value of the environmental benefits was considered as part of the Societal Test when determining cost-effectiveness of the programs.

**J. Coordinated Demand Response Program**

On a parallel track with Bright Energy Solutions, MRES also began to develop a Coordinated Demand Response (CDR) program designed to encourage members to install or update load control equipment that would allow MRES and its members to shift customer load during times of peak demand to non-peak periods. Load control/demand response can be achieved through direct load control, interruptible service, building pre-heating/pre-cooling or storage, industrial process load control, or response to market prices. MRES will pay a verification payment based on the number of control points connected to the load management system and an annual verification of such points. The payment amounts are \$5.00 per year for each controlled central air conditioner and \$1.75 per year for each controlled electric water heater the member controls during the member's summer peak demand period and provides verification of such control.

**i. Shared Benefits of CDR**

MRES first focused on direct load control of air conditioners and electric water heaters since many MRES members were familiar with that technology and many already had equipment in place that could be used or updated. In 2011, MRES began to offer an incentive for every air conditioner and electric water heater that was controlled during the summer months of June, July, August and September. Testing and reporting requirements were put in place to ensure that the load control system was working properly and that load reduction was actually achieved. The incentive applies to members with existing load control systems as well as new systems that are operated under the CDR program.

Several barriers to the implementation of new direct load control by individual MRES member utilities were uncovered by the DSM Task Force. The primary barrier was that members did not have sufficient staff to install equipment, develop control strategies, monitor, operate, and test a direct load control system. To address this issue, MRES developed a CDR program that could be monitored and operated by MRES staff and/or individual member staff. The CDR program provides the following benefits:

- Lower demand charges for MRES members
- Cost-effective alternative to future peaking capacity for MRES
- Shared software/hardware costs
- Shared expertise/labor in operating the system
- Group pricing on load control devices and software fees

- Less staff time for MRES members

## **ii. CDR Participation**

The development of the CDR program has been fairly slow due to the high capital investment associated with the installation of a load control system and with the time that it takes to install a system. Also, members wanted to coordinate any investment made in load control equipment with their plans to install advanced metering infrastructure (AMI), since both systems could use some of the same technology and communications systems. In 2014, eight (8) members of MRES are participating in the CDR program and are at various stages of implementation. One of those members is installing CDR and AMI equipment simultaneously. AMI equipment may allow members to achieve demand response using dynamic price signals in the future.

## **iii. CDR Results**

The following are the 2011 through 2013 direct load control results reported either by members with existing load control systems or through CDR participation:

	<b>AC Points Controlled</b>	<b>AC Load Reduction kW</b>	<b>WH Points Controlled</b>	<b>WH Points Reduction kW</b>
2011	8,732	8,732	8,318	2,911
2012	11,784	11,784	9,083	3,179
2013	11,952	11,952	8,815	3,085
<b>Totals</b>	32,468	<b>32,468</b>	26,216	<b>9,176</b>

## **II. Beresford, SD Resource Planning**

### **A. *City Information***

Beresford, located in Union and Lincoln Counties, is a community of more than 2,000 individuals located in southeastern South Dakota. The City has one elementary school, one junior high, and one high school. In 2010, the residential sector included 861 occupied housing units. The median age of the population is 38.5 years. About 19.1% of the population is 65 years of age or older and about 25.4% percent are under 18 years old.

In 2012, the municipal utility had 895 residential customers, 268 commercial customers, and 16 industrial customers. The residential sector's yearly usage averaged 10,645 kWh per customer in 2012. Commercial customers averaged 20,198 kWh. Industrial customers averaged 941,938 kWh. The rates for each type of customer are shown on the rate sheet in Exhibit 1.

The rates for each type of customer are shown in Exhibit 1. Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4, which show the winter and summer peak demand and energy for the seasons 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Beresford on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 6502 kW in the winter and 6212 kW in the summer.

Exhibits 7 and 8 each show the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load increasing from midnight to 8 am then leveling off until 1 pm, and then loads begin to decline until 4 pm. Then loads pick up again near 6 pm with a steady decline the rest of the day. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline load occurs until 6 am the next day.

## Exhibit 1

### BERESFORD, SOUTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$12.98
	\$/kWh	\$.096
Small Commercial	Customer Charge	\$19.53
	\$/kWh	\$.087
Large Commercial	Customer Charge	\$31.74
	\$/kWh	\$.045
	\$/kW	\$13.58

## Exhibit 2

MRES Seasonal Load Report  
 Beresford, SD  
 Town Gate Load  
 BASE Forecast

1/31/14 2:14 PM

Town Gate Load

Monthly Splits

Historic Through 12/2013

	Demand (kW)			
Summer	<u>Total</u>	<u>WAPA</u>	<u>MRES</u>	<u>Other</u>
2001	5,892	2,905	3,157	0
2002	5,691	2,905	2,808	0
2003	5,628	2,905	2,893	0
2004	5,784	2,905	2,901	0
2005	5,888	2,905	3,153	0
2006	6,128	2,900	3,250	0
2007	6,212	2,900	3,413	0
2008	5,520	2,900	2,653	0
2009	5,426	2,900	2,695	0
2010	5,770	2,900	3,039	0
2011	6,940	2,900	4,209	0
2012	6,957	2,900	4,079	0
2013	6,502	2,900	3,771	0
2014	6,045	2,900	3,314	0
2015	6,071	2,900	3,340	0
2016	6,146	2,900	3,415	0
2017	6,229	2,900	3,498	0
2018	6,317	2,900	3,586	0

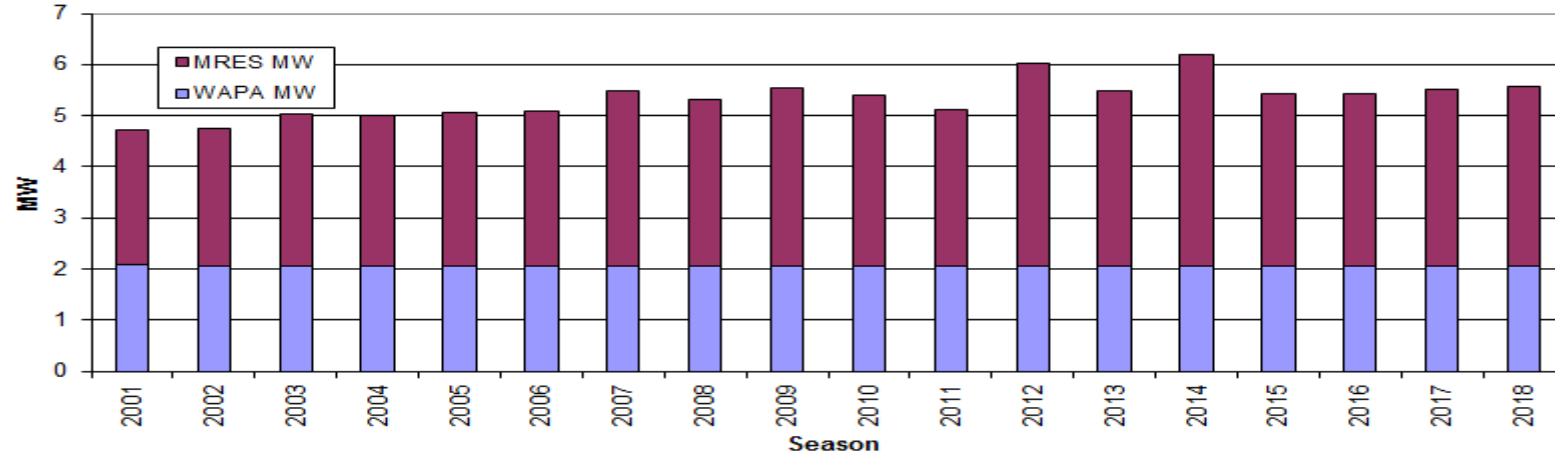
	Demand (kW)			
Winter	<u>Total</u>	<u>WAPA</u>	<u>MRES</u>	<u>Other</u>
2002	4,490	2,057	2,703	0
2003	5,017	2,057	2,966	0
2004	5,005	2,057	2,954	0
2005	5,001	2,057	3,012	0
2006	5,035	2,053	3,046	0
2007	5,486	2,053	3,439	0
2008	5,040	2,053	3,263	0
2009	5,272	2,053	3,495	0
2010	5,320	2,053	3,335	0
2011	5,100	2,053	3,053	0
2012	5,962	2,053	3,977	0
2013	5,380	2,053	3,431	0
2014	6,122	2,053	4,137	0
2015	5,347	2,053	3,362	0
2016	5,370	2,053	3,385	0
2017	5,437	2,053	3,452	0
2018	5,510	2,053	3,525	0

	Energy (kWh)			
Summer	<u>Total</u>	<u>WAPA</u>	<u>MRES</u>	<u>Other</u>
2001	13,011,264	6,512,000	6,499,264	0
2002	13,731,408	6,512,000	7,219,408	0
2003	13,255,200	6,512,000	6,743,200	0
2004	13,930,480	6,512,000	7,418,480	0
2005	14,793,410	6,512,000	8,281,410	0
2006	15,351,112	6,500,000	8,851,112	0
2007	15,648,478	6,500,000	9,148,478	0
2008	14,247,745	6,500,000	7,747,745	0
2009	12,994,581	6,500,000	6,494,581	0
2010	13,498,680	6,500,000	6,998,680	0
2011	15,399,888	6,500,000	8,899,888	0
2012	15,936,607	6,500,000	9,436,607	0
2013	15,209,643	6,500,000	8,709,643	0
2014	14,670,757	6,500,000	8,170,757	0
2015	14,734,920	6,500,000	8,234,920	0
2016	14,916,883	6,500,000	8,416,883	0
2017	15,118,003	6,500,000	8,618,003	0
2018	15,330,766	6,500,000	8,830,766	0

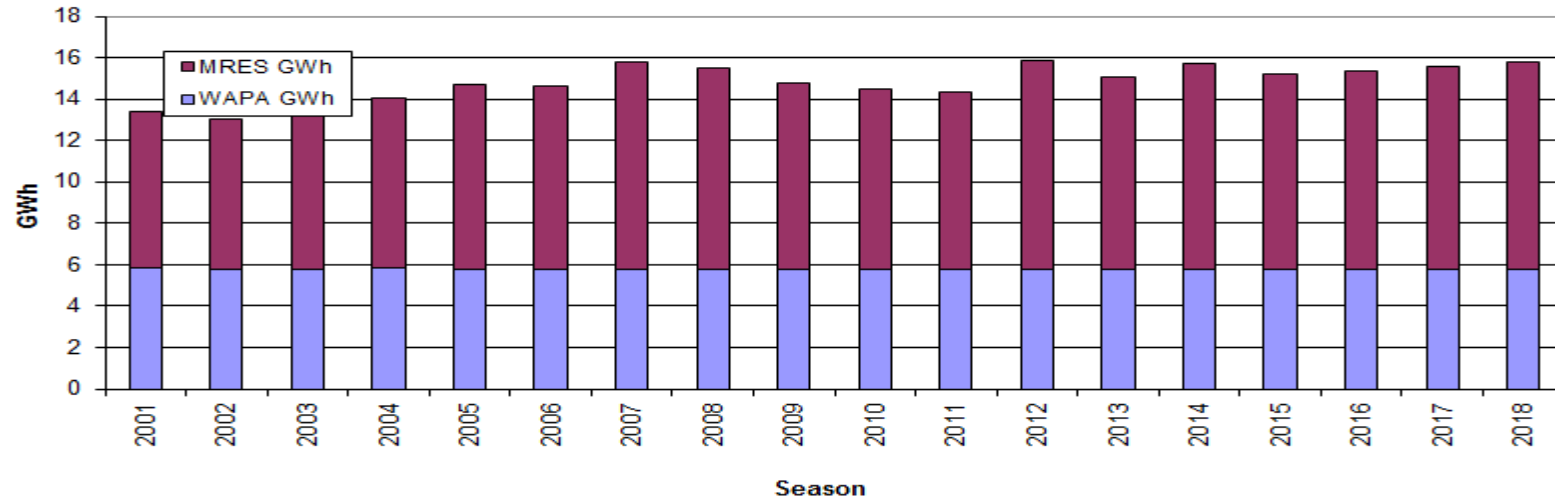
	Energy (kWh)			
Winter	<u>Total</u>	<u>WAPA</u>	<u>MRES</u>	<u>Other</u>
2002	13,013,712	5,782,000	7,231,712	0
2003	13,787,856	5,782,000	8,005,856	0
2004	14,047,344	5,818,000	8,229,344	0
2005	14,714,235	5,782,000	8,932,235	0
2006	14,657,019	5,774,000	8,883,019	0
2007	15,794,834	5,770,000	10,024,834	0
2008	15,529,323	5,806,000	9,723,323	0
2009	14,777,339	5,770,000	9,007,339	0
2010	14,490,007	5,770,000	8,720,007	0
2011	14,361,028	5,770,000	8,591,028	0
2012	15,855,202	5,806,000	10,049,202	0
2013	15,032,613	5,770,000	9,262,613	0
2014	15,712,570	5,770,000	9,942,570	0
2015	15,198,987	5,770,000	9,428,987	0
2016	15,344,602	5,806,214	9,538,388	0
2017	15,545,483	5,770,000	9,775,483	0
2018	15,761,094	5,770,000	9,991,094	0

### Exhibit 3

**Beresford, SD  
Winter Demand - Town Gate**

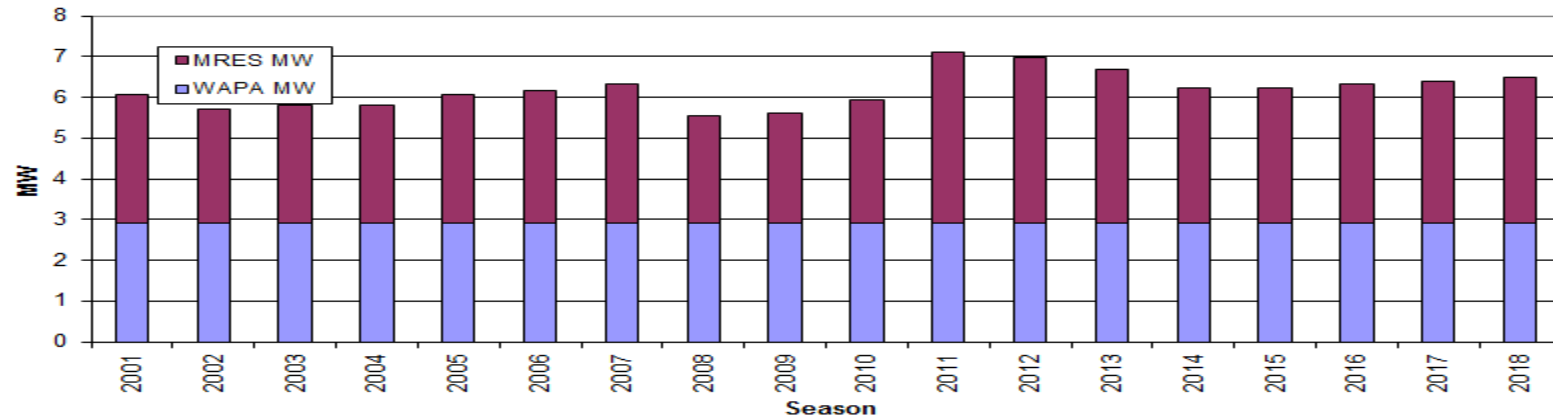


**Beresford, SD  
Winter Energy - Town Gate**

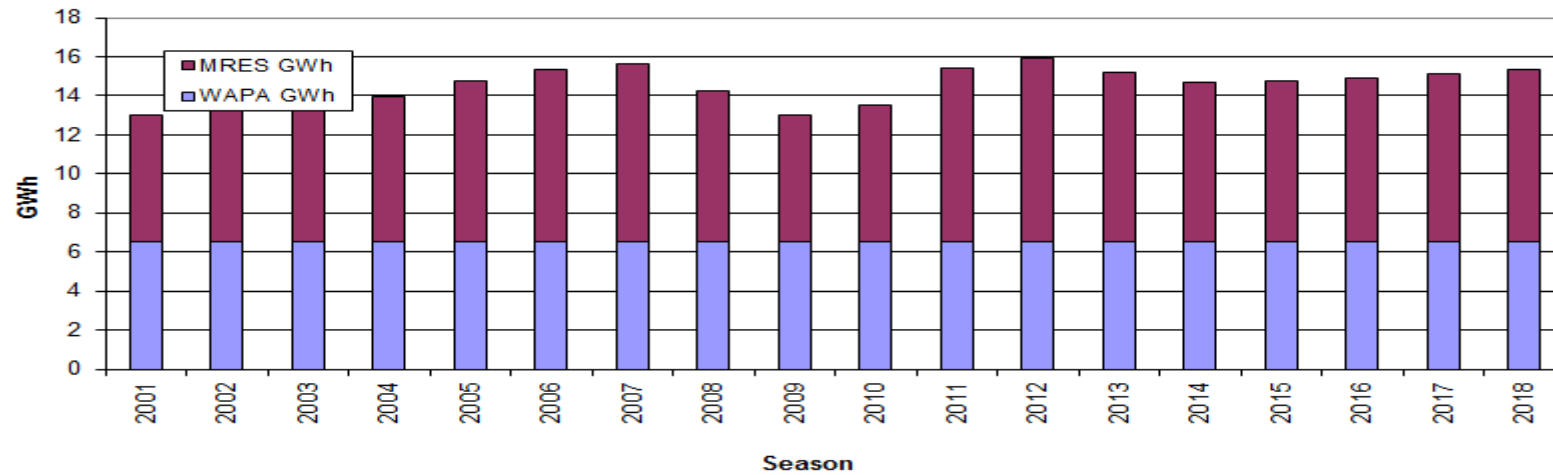


## Exhibit 4

### Beresford, SD Summer Demand - Town Gate

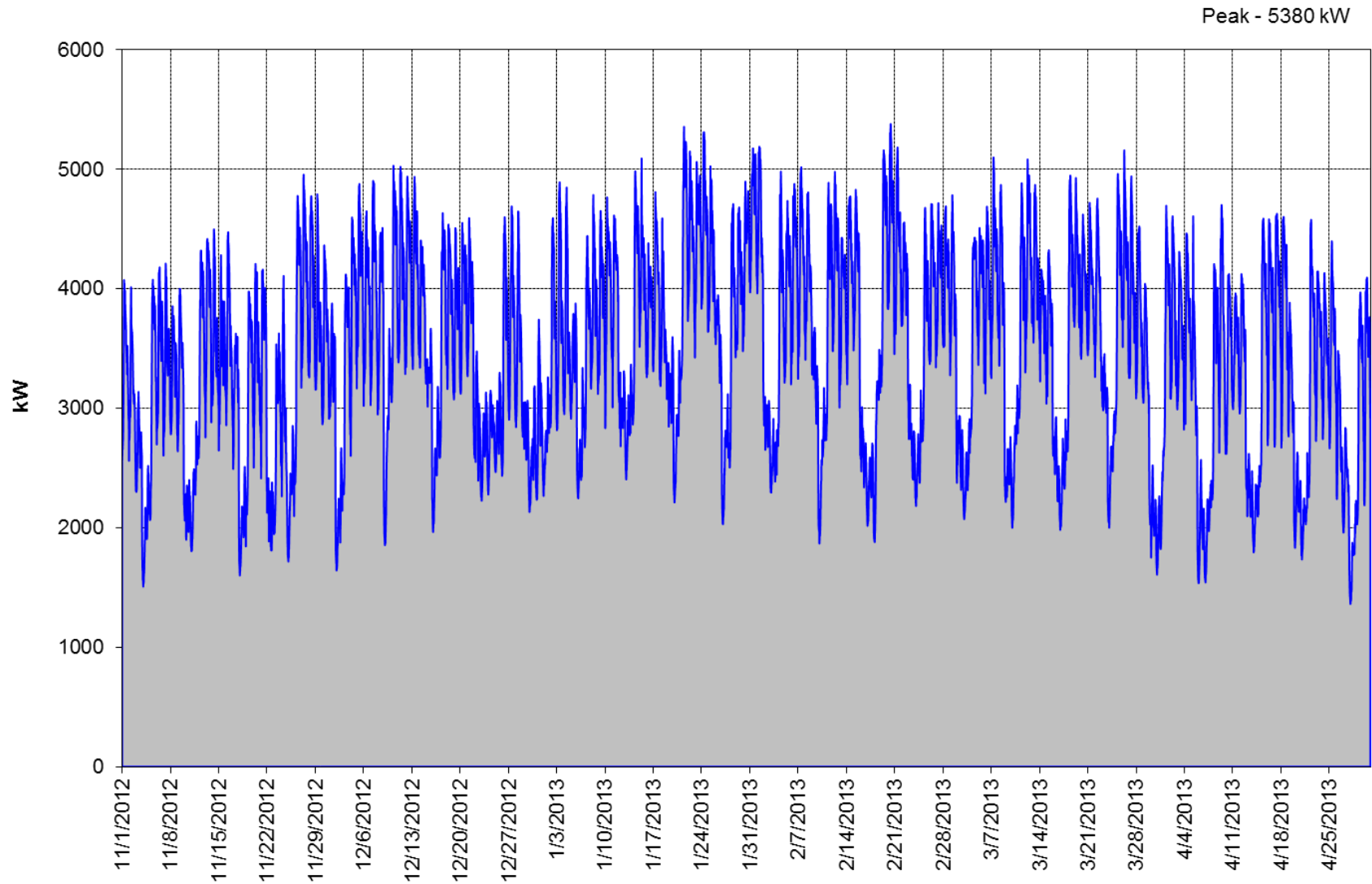


### Beresford, SD Summer Energy - Town Gate



## Exhibit 5

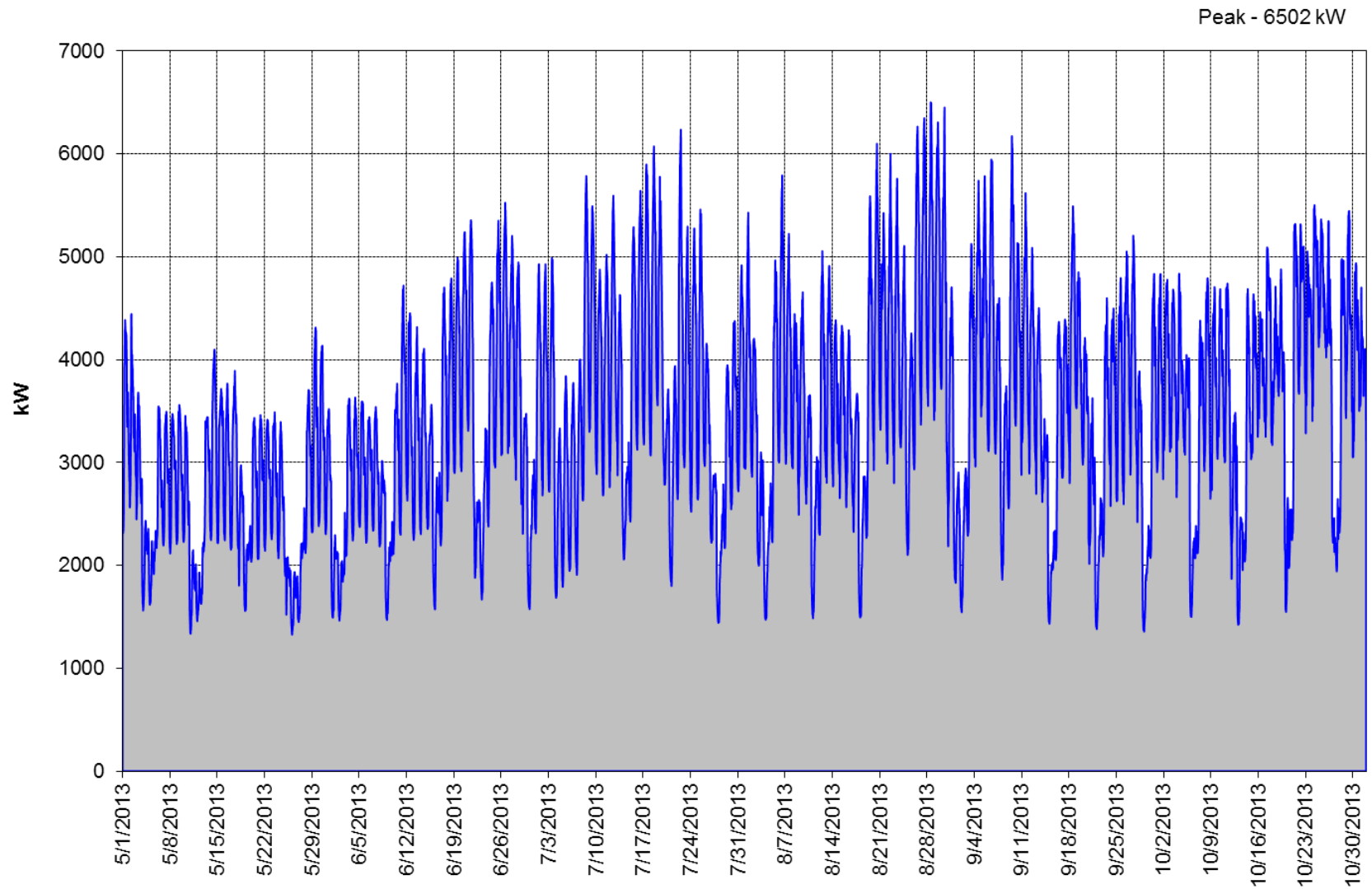
### Beresford, SD Winter 2012-2013 Half-Hour Load Shape - Town Gate





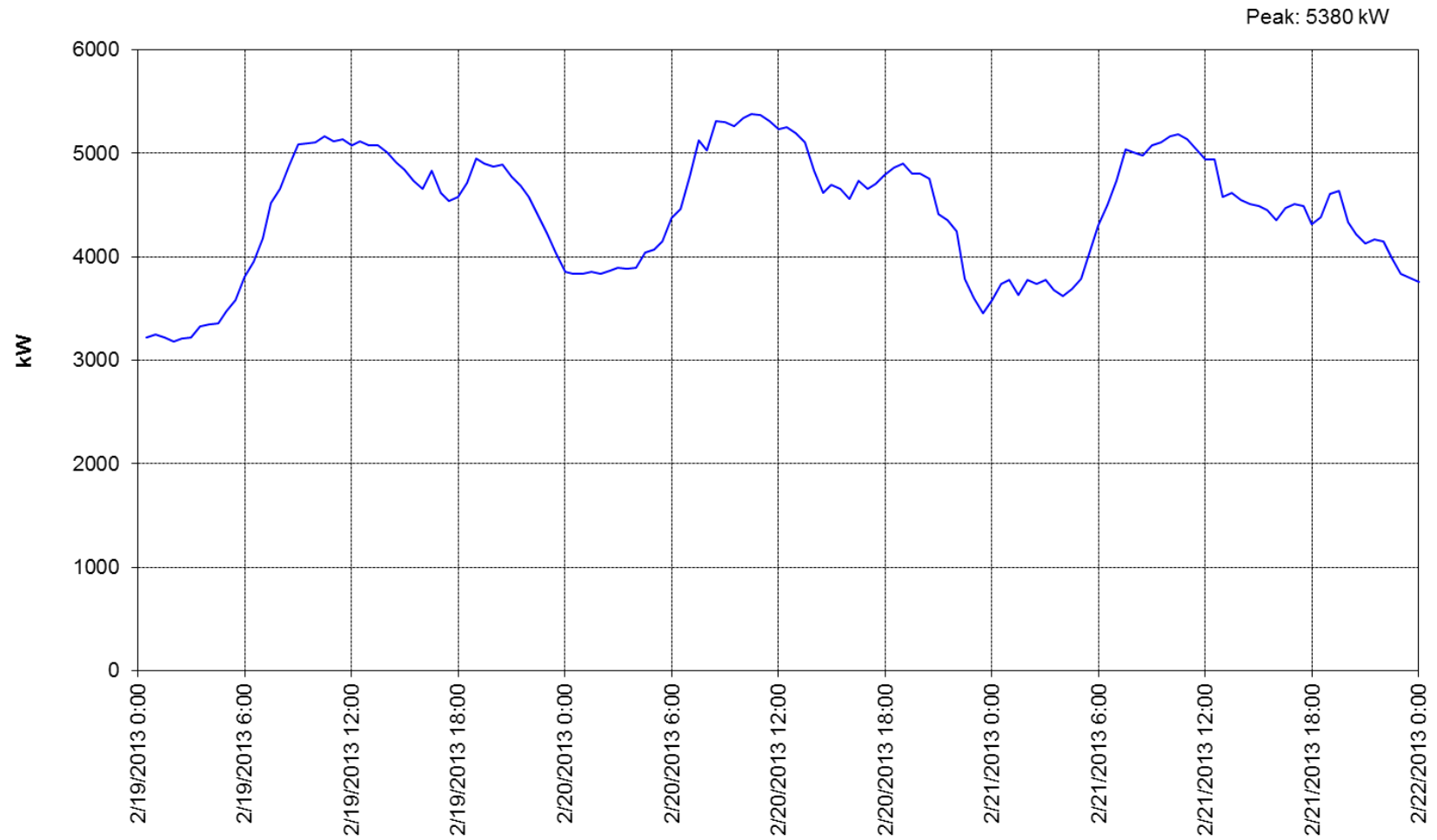
## Exhibit 6

### Beresford, SD Summer 2013 Half-Hour Load Shape - Town Gate



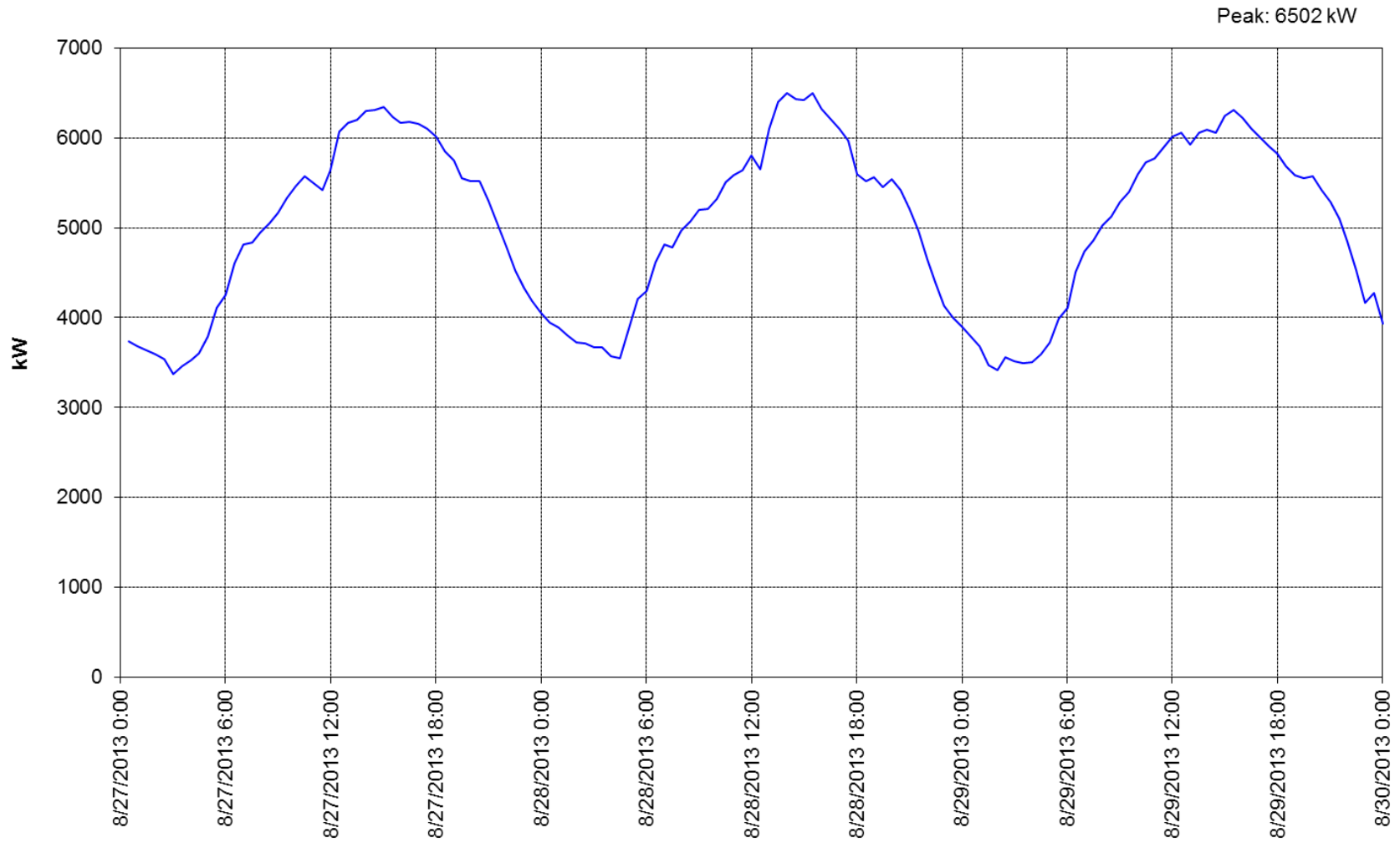
## Exhibit 7

Beresford, SD Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate



## Exhibit 8

Beresford, SD Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Beresford is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Beresford to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Beresford has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2009	Custom Lighting	BES	1	\$ 514	1.7	3,290
	Lighting	BES	223	\$ 16,119	28.3	123,128
	Lighting - New Const	BES	34	\$ 2,040	5.0	21,862
<b>2009 Total</b>			<b>258</b>	<b>\$ 18,673</b>	<b>35.0</b>	<b>148,280</b>
2010	CI HVAC	BES	1	\$ 2,000	6.8	10,561
	Food Service	BES	1	\$ 300	0.3	2,695
	Lighting	City	445	\$ -	40.6	170,394
	Lighting - Retrofit	BES	293	\$ 5,890	13.0	38,460
<b>2010 Total</b>			<b>740</b>	<b>\$ 8,190</b>	<b>60.6</b>	<b>222,110</b>
2011	Custom Electric Program	BES	2	\$ 865	5.1	149,793
	Lighting	City	185	\$ -	24.1	5,121
	Lighting - New Const	BES	96	\$ 2,400	7.2	44,277
	Lighting - Retrofit	BES	788	\$ 41,900	110.5	372,053
	VFDs and Pumps	BES	1	\$ 100	0.1	509
	Res Lighting	BES	432	\$ 648	1.7	16,773
<b>2011 Total</b>			<b>1504</b>	<b>\$ 45,913</b>	<b>148.7</b>	<b>588,526</b>
2012	Lighting - New Const	BES	46	\$ 2,300	21.5	75,054
	Lighting - Retrofit	BES	188	\$ 2,760	10.0	35,489
<b>2012 Total</b>			<b>234</b>	<b>\$ 5,060</b>	<b>31.5</b>	<b>110,543</b>
2013	Lighting - New Const	BES	14	\$ 700	2.7	7,438
	Lighting - Retrofit	BES	12	\$ 180	0.6	1,914
<b>2013 Total</b>			<b>26</b>	<b>\$ 880</b>	<b>3.3</b>	<b>9,352</b>
<b>Grand Total</b>			<b>2762</b>	<b>\$ 78,716</b>	<b>279.3</b>	<b>1,078,811</b>

- Load Management Program**

Description: Load management control boxes are on all electric water heaters, central air conditioners, and electric space heaters.

Energy Savings: Approximately 4.5 MW on peak.

Cost: Approximately \$1,500 annually.

### ***D. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of

incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Beresford was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

## ***E. Options Chosen – Development of Action Plan***

### ***i. Future Actions***

It is assumed that Beresford will continue to participate in the Bright Energy Solutions program. Beresford would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Beresford will participate in all of the Bright Energy Solutions programs to the extent possible, with the exception of residential appliance measures, where Beresford Utility personnel has identified that participation levels might be reduced due to the lack of market potential. This assumption was made only to obtain more realistic expectations for the five-year plan, and is certainly not considered to be a cap on participation in the event that the program attracts more participants than anticipated.

Representatives from Beresford plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, Beresford is successfully operating their own Load Management program, and it is unknown if they will participate in the MRES Coordinated Demand Response (CDR) program in the future. That decision will be evaluated in years to come.

### ***ii. Milestones***

As part of the annual WAPA IRP updates, Beresford will evaluate the progress on these programs. The success will be measured against this 5-year plan, with adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field

inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

#### ***F. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

#### ***G. Public Participation***

A preliminary draft of this report was produced on April 23, 2014. A notice of public hearing on IRP was published in the local newspaper on July 15, 2014. The public hearing on the IRP was held at the August 4, 2014 City Council meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The City Council approved the resolution on August 4, 2014. A copy of the approved resolution is included in Appendix 2 at the end of this section.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b><i>4/23/2014</i></b>
Date Published in Paper	<b><i>7/15/2014</i></b>
Public Hearing Date	<b><i>8/4/2014</i></b>
Date Approved by City Council	<b><i>8/4/2014</i></b>

## Appendix 1 – Detailed DSM Measures Installed

Utility Beresford

			BES or City				
Year	Program	Measure		Quan	Incentive	kW	kWh
2009	Custom Lighting	T8 HB 6L	BES	1	\$ 514	1.7	3,290
					\$ 514	1.7	3,290
	Lighting	T8 4' 3L	BES	14	\$ 154	0.4	1,666
		T8 4' 4L	BES	5	\$ 65	0.2	630
				20	\$ 1,280	0.7	2,520
		T8 HB 6L	BES	12	\$ 1,020	3.5	15,432
				30	\$ 5,100	8.8	38,580
				100	\$ 8,500	14.7	64,300
					\$ 16,119	28.3	123,128
	Lighting - New Const	T8 HB 6L	BES	12	\$ 720	1.8	7,716
				22	\$ 1,320	3.2	14,146
					\$ 2,040	5.0	21,862
2009 Total					\$ 18,673	35.0	148,280
2010	CI HVAC	Air Cooled Chiller	BES	1	\$ 2,000	6.8	10,561
					\$ 2,000	6.8	10,561
	Food Service	ES Ice Machines	BES	1	\$ 300	0.3	2,695
					\$ 300	0.3	2,695
	Lighting	Street Lights	City	445	\$ -	40.6	170,394
					\$ -	40.6	170,394
	Lighting - Retrofit	Ltng Retrofit _ LED & Induction Tech	BES	1	\$ 12	0.0	166
				3	\$ 320	0.0	1,008
		Ltng Retrofit _FlrsCnt T8 & T5 w/Elec Bal	BES	206	\$ 1,652	3.6	10,042
		Ltng Retrofit _ T8 Hi Bay Fixtures w-Elec Bal	BES	36	\$ 3,060	7.9	23,243
		Ltng Retrofit _ Rducd Wtg T8 CEE Qual	BES	47	\$ 846	1.5	4,001
					\$ 5,890	13.0	38,460
2010 Total					\$ 8,190	60.6	222,110
2011	Custom Electric Program	Custom 400 hp Nema Premium Motor	BES	1	\$ 742	2.0	144,220
		Replace large inc. with CFL.	BES	1	\$ 122	3.1	5,573
					\$ 865	5.1	149,793
	Lighting	Street Lights	City	185	\$ -	24.1	5,121
					\$ -	24.1	5,121
	Lighting - New Const	Ltng NC _ T8 4ft Hi Bay Fixture	BES	96	\$ 2,400	7.2	44,277
					\$ 2,400	7.2	44,277
	Lighting - Retrofit	Ltng Retro _ Othr Eff Ltng Tech/Ctld	BES	320	\$ 3,200	9.8	69,386
		Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	7	\$ 595	1.5	13,314
				52	\$ 4,420	11.5	71,027
				394	\$ 33,490	87.4	217,341
		Ltng Retro _FlrsCnt T8 & T5 w/Elec Bal	BES	15	\$ 195	0.3	985
					\$ 41,900	110.5	372,053
	VFDs and Pumps	Repl on Fail 3 Phase 1800 RPM	BES	1	\$ 100	0.1	509



					\$	100	0.1	509
Res Lighting	CFL Fixtures and Lamps	BES	432	\$	648	1.7	16,773	
				\$	648	1.7	16,773	
<b>2011 Total</b>					\$	45,913	148.7	588,526
2012	Lighting - New Const	Ltng NC _ T8 4ft Hi Bay Fixture	BES	46	\$	2,300	21.5	75,054
					\$	2,300	21.5	75,054
	Lighting - Retrofit	Ltng Retro _ LED & Induction Tech	BES	188	\$	2,760	10.0	35,489
					\$	2,760	10.0	35,489
<b>2012 Total</b>					\$	5,060	31.5	110,543
2013	Lighting - New Const	T8 4ft Hi Bay Fixture	BES	14	\$	700	2.7	7,438
					\$	700	2.7	7,438
	Lighting - Retrofit	LED & Induction Tech	BES	12	\$	180	0.6	1,914
					\$	180	0.6	1,914
<b>2013 Total</b>					\$	880	3.3	9,352
<b>Grand Total</b>					\$	78,716	279.3	1,078,811

## Appendix 2 – Beresford Resolution

### RESOLUTION NO. 2014-05

**WHEREAS,** the City of Beresford purchases a significant portion of its power supply from the Western Area Power Administration (Western); and

**WHEREAS,** Western has recently published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing of an Integrated Resource Plan (IRP); and

**WHEREAS,** the municipal utility staff has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and

**WHEREAS,** our customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and

**WHEREAS,** any public comments received have been addressed in order to strengthen the city's Integrated Resource Plan; and

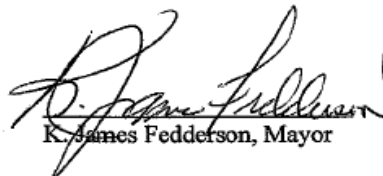
**WHEREAS,** the IRP Summary Report included 5-year and 2-year action plans outlining actions to be taken by the Municipal utility during the next several years

**NOW THEREFORE BE IT RESOLVED BY** the City of Beresford City Council as follows:

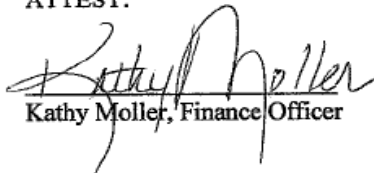
That the "Integrated Resource Plan Summary Report for the City of Beresford dated September 1, 2014 shall be approved for filing with Western under the Energy Planning and Management Program."

Passed and approved this 4th day of August, 2014.

(SEAL)

  
K. James Fedderson, Mayor

ATTEST:

  
Kathy Moller, Finance Officer

### **III. Brookings, SD Resource Planning**

#### **A. *City Information***

Brookings, located in Brookings County, is a community of more than 22,000 individuals located in eastern South Dakota. Municipal services include electricity, water, sewer, and telephone services. The city is the home of South Dakota State University. Daktronics is also headquartered in Brookings.

The three largest employers in Brookings are South Dakota State University (2,121 employees), Daktronics (1,655 employees), and 3M (796 employees). In 2010, the residential sector included 8,715 occupied housing units. The median age of the population is 23.5 years. About 8.4% of the population is 65 years of age or older, and about 16.1% are under 18 years old.

In 2012, the municipal utility had 8,471 residential customers, 1,312 commercial customers, and 148 industrial customers. The residential sector's yearly usage averaged 10,444 kWh per customer in 2012. Commercial customers averaged 29,979 kWh, and industrial customers averaged 1,063,757 kWh.

The rates for each type of customer are shown in Exhibit 1. Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4, which show the winter and summer peak demand and energy for the seasons 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Brookings on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 53,089 kW in the winter and 59,884 kW in the summer.

Exhibits 7 and 8 each show the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load increasing from midnight to 8 am, then leveling off till 1 pm then loads begin to decline until 4 pm. Then loads pick up again near 6 pm with a steady decline the rest of the day. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline load occurs until 6 am the next day.

## **Exhibit 1**

### **BROOKINGS, SOUTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE**

<b>Customer Class</b>	<b>Rate Component</b>	<b>Current Rate</b>
Residential	Customer Charge	\$13.25
	\$/kWh Jun-Aug	\$.087
	\$/kWh Sep-May	\$.074
Small Commercial	Customer Charge	\$23.00
	\$/kWh Jun-Aug	\$.093
	\$/kWh Sep-May	\$.081
Large Commercial	Customer Charge	\$100.00
	\$/kWh	\$.035
	\$/kW Jun-Aug	\$17.45
	\$/kW Sep-May	\$11.75
Industrial	Customer Charge	\$130.00
	\$/kWh	\$.034
	\$/kW Jun-Aug	\$17.05
	\$/kW Sep-May	\$11.35

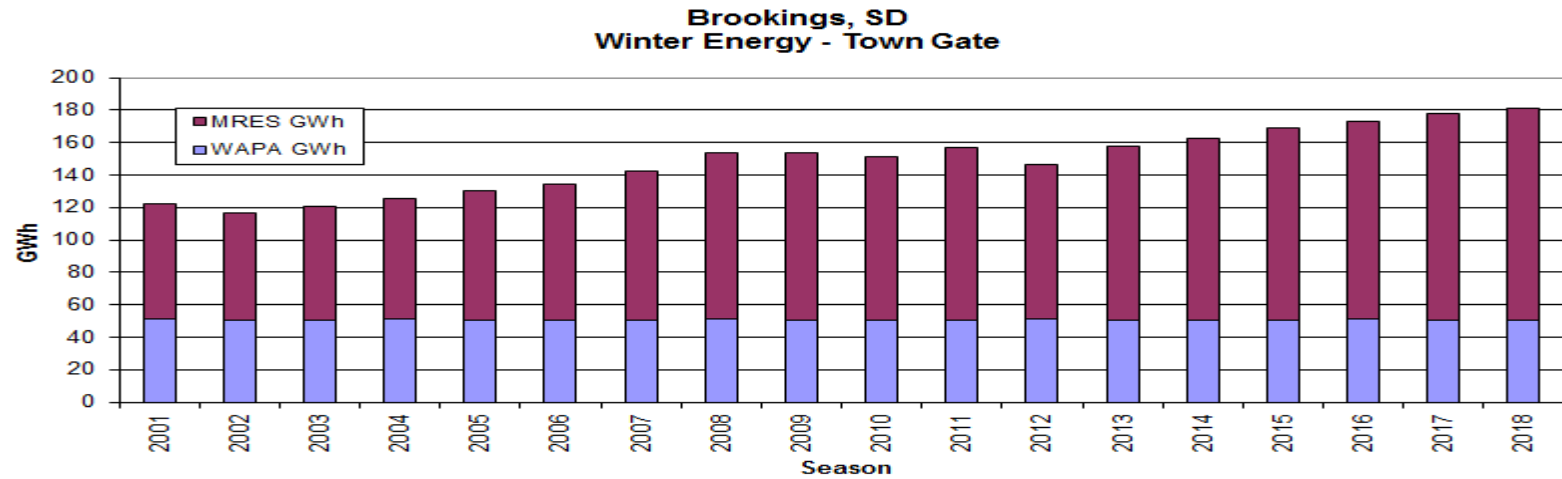
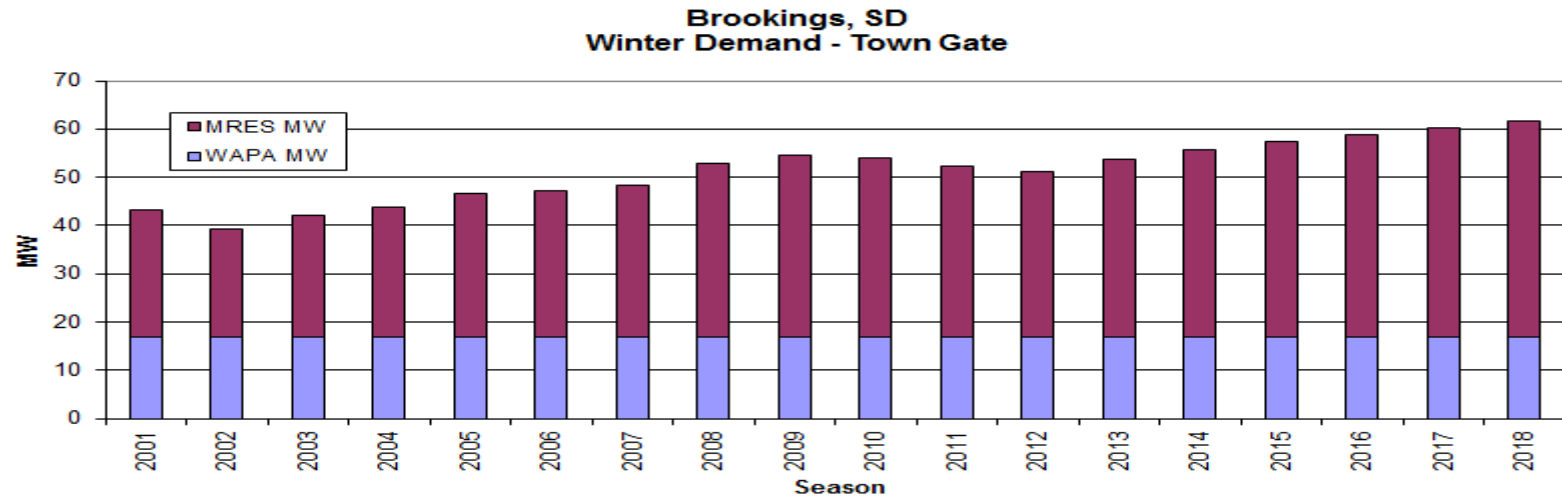
## Exhibit 2

MRES Seasonal Load Report  
 Brookings, SD  
 Town Gate Load  
 BASE Forecast

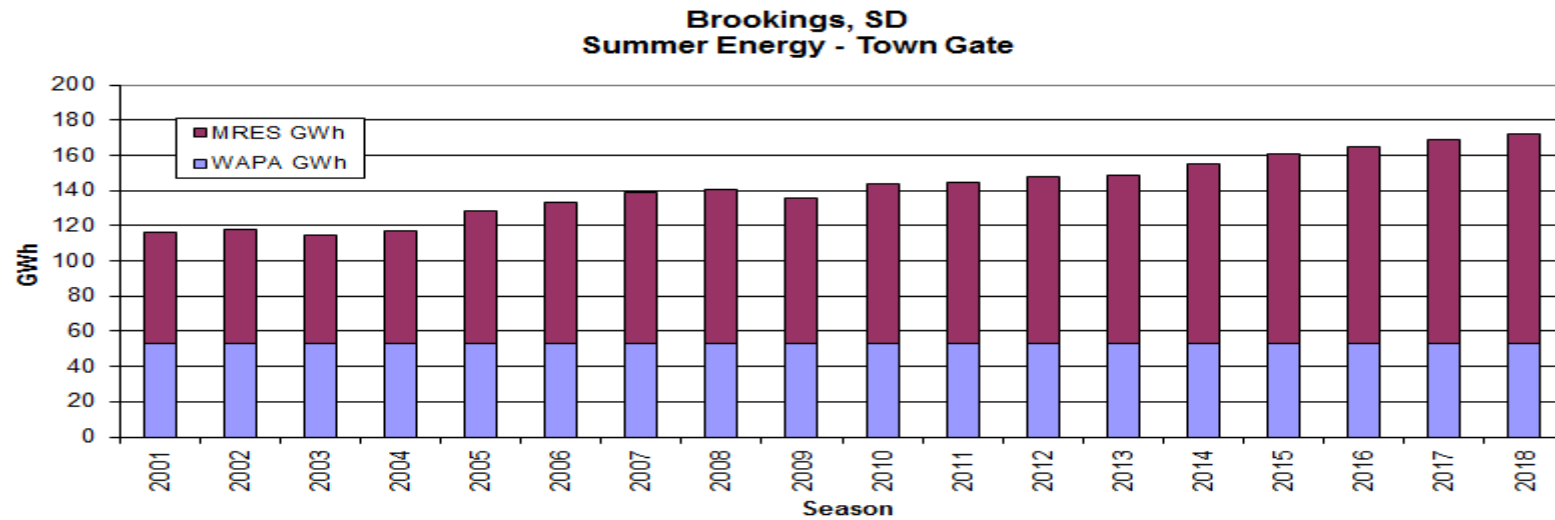
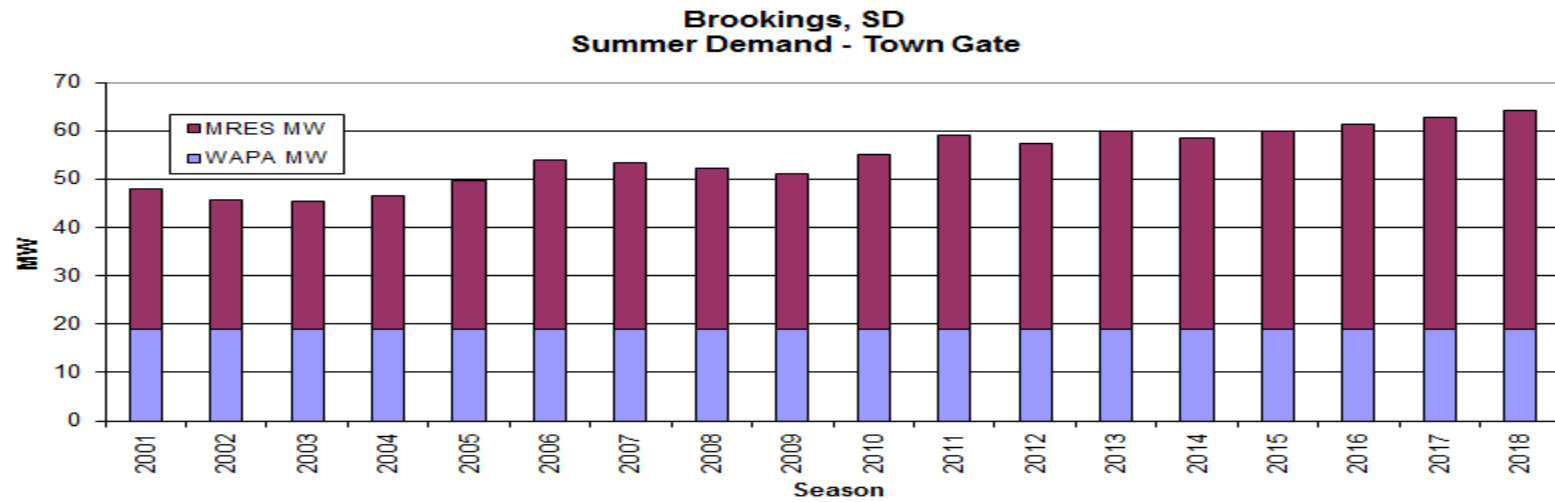
1/31/14 2:13 PM  
 Town Gate Load  
 Monthly Splits  
 Historic Through 12/2013

Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	47,840	18,972	28,868	0	2001	115,892,235	53,107,000	62,785,235	0
2002	45,411	18,972	26,613	0	2002	117,433,059	53,107,000	64,326,059	0
2003	45,500	18,972	26,528	0	2003	114,530,975	53,107,000	61,423,975	0
2004	46,520	18,972	27,548	0	2004	117,172,513	53,107,000	64,065,513	0
2005	49,624	18,972	30,652	0	2005	128,271,742	53,107,000	75,164,742	0
2006	53,842	18,941	34,901	0	2006	133,078,312	53,020,000	80,058,312	0
2007	53,491	18,941	34,550	0	2007	138,959,941	53,020,000	85,939,941	0
2008	52,168	18,941	33,227	0	2008	140,885,981	53,020,000	87,865,981	0
2009	50,308	18,941	32,046	0	2009	135,947,835	53,020,000	82,927,835	0
2010	55,077	18,941	36,136	0	2010	143,433,976	53,020,000	90,413,976	0
2011	58,977	18,941	40,036	0	2011	144,936,702	53,020,000	91,916,702	0
2012	57,406	18,941	38,465	0	2012	148,157,922	53,020,000	95,137,922	0
2013	59,884	18,941	40,943	0	2013	148,629,861	53,020,000	95,609,861	0
2014	58,533	18,941	39,592	0	2014	154,975,329	53,020,000	101,955,329	0
2015	59,932	18,941	40,991	0	2015	160,939,422	53,020,000	107,919,422	0
2016	61,458	18,941	42,517	0	2016	165,038,236	53,020,000	112,018,236	0
2017	62,882	18,941	43,941	0	2017	168,862,932	53,020,000	115,842,932	0
2018	64,190	18,941	45,249	0	2018	172,375,197	53,020,000	119,355,197	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	38,592	16,869	22,443	0	2002	116,490,623	50,708,000	65,782,623	0
2003	41,361	16,869	25,212	0	2003	120,178,701	50,708,000	69,470,701	0
2004	43,109	16,869	26,960	0	2004	125,238,525	51,043,000	74,195,525	0
2005	46,033	16,869	29,884	0	2005	130,163,421	50,708,000	79,455,421	0
2006	45,700	16,833	30,472	0	2006	134,335,498	50,633,000	83,702,498	0
2007	48,328	16,833	31,602	0	2007	142,261,011	50,599,000	91,662,011	0
2008	52,612	16,833	35,886	0	2008	153,941,948	50,933,000	103,008,948	0
2009	53,938	16,833	37,824	0	2009	153,941,076	50,599,000	103,342,076	0
2010	52,431	16,833	37,236	0	2010	151,004,978	50,599,000	100,405,978	0
2011	52,190	16,833	35,464	0	2011	157,138,976	50,599,000	106,539,976	0
2012	50,400	16,833	34,286	0	2012	146,428,900	50,933,000	95,495,900	0
2013	53,098	16,833	36,984	0	2013	157,903,971	50,599,000	107,304,971	0
2014	54,019	16,833	38,824	0	2014	162,611,899	50,599,000	112,012,899	0
2015	56,777	16,833	40,663	0	2015	169,123,199	50,599,000	118,524,199	0
2016	58,223	16,833	42,109	0	2016	173,342,038	50,933,000	122,409,038	0
2017	59,572	16,833	43,458	0	2017	177,490,753	50,599,000	126,891,753	0
2018	60,811	16,833	44,697	0	2018	181,322,209	50,599,000	130,723,209	0

### Exhibit 3

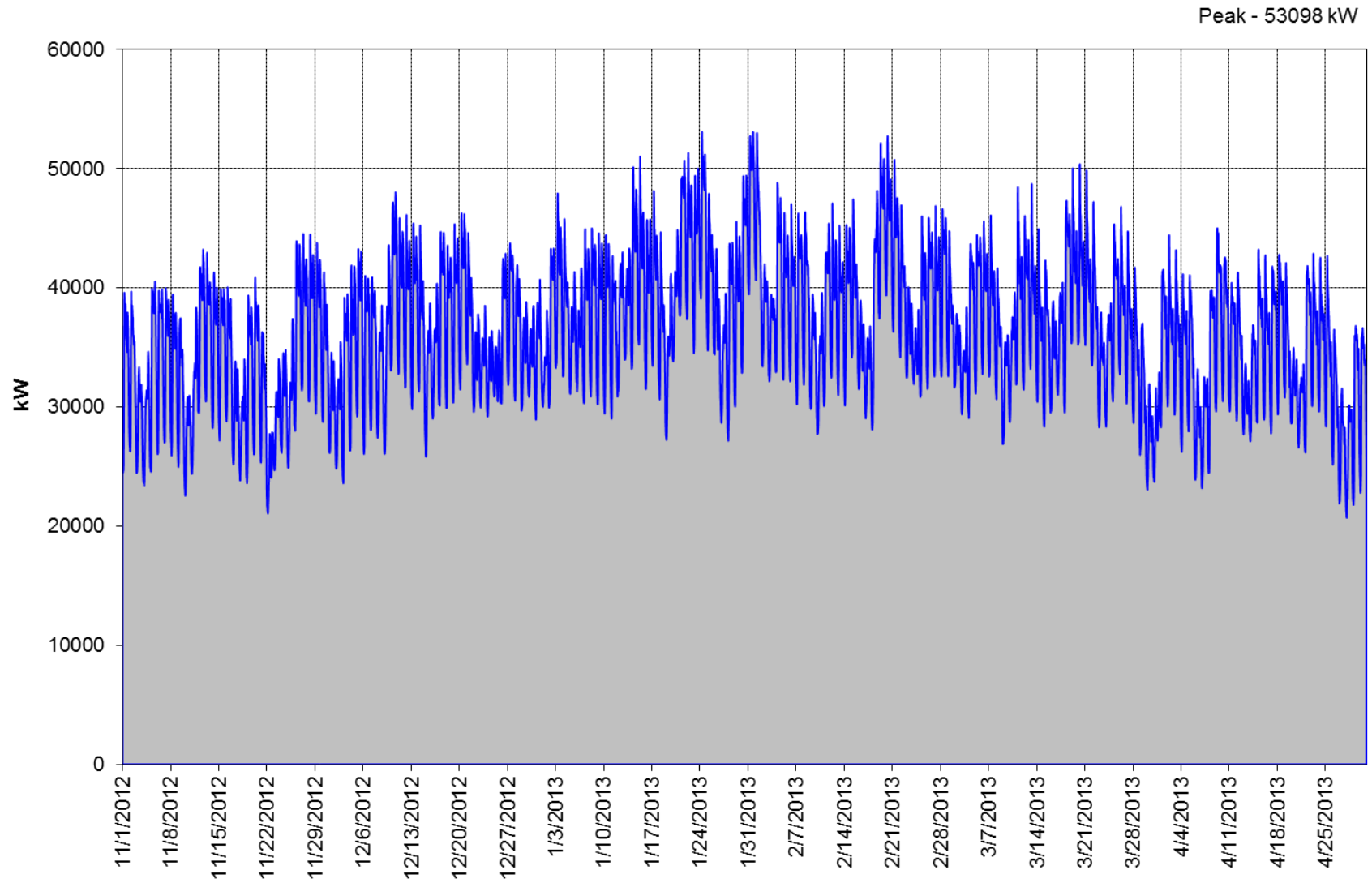


## Exhibit 4



## Exhibit 5

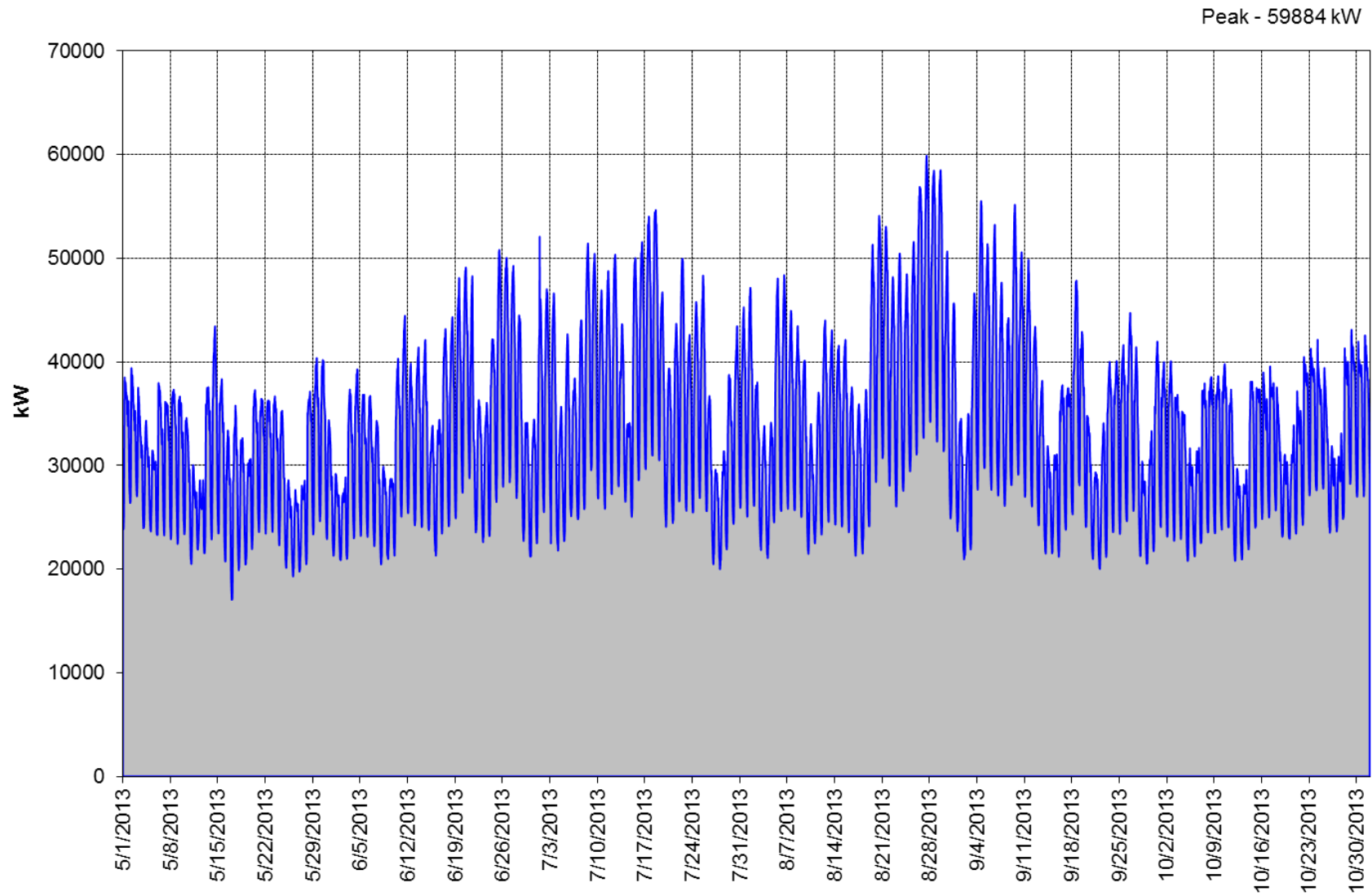
### Brookings, SD Winter 2012-2013 Half-Hour Load Shape - Town Gate





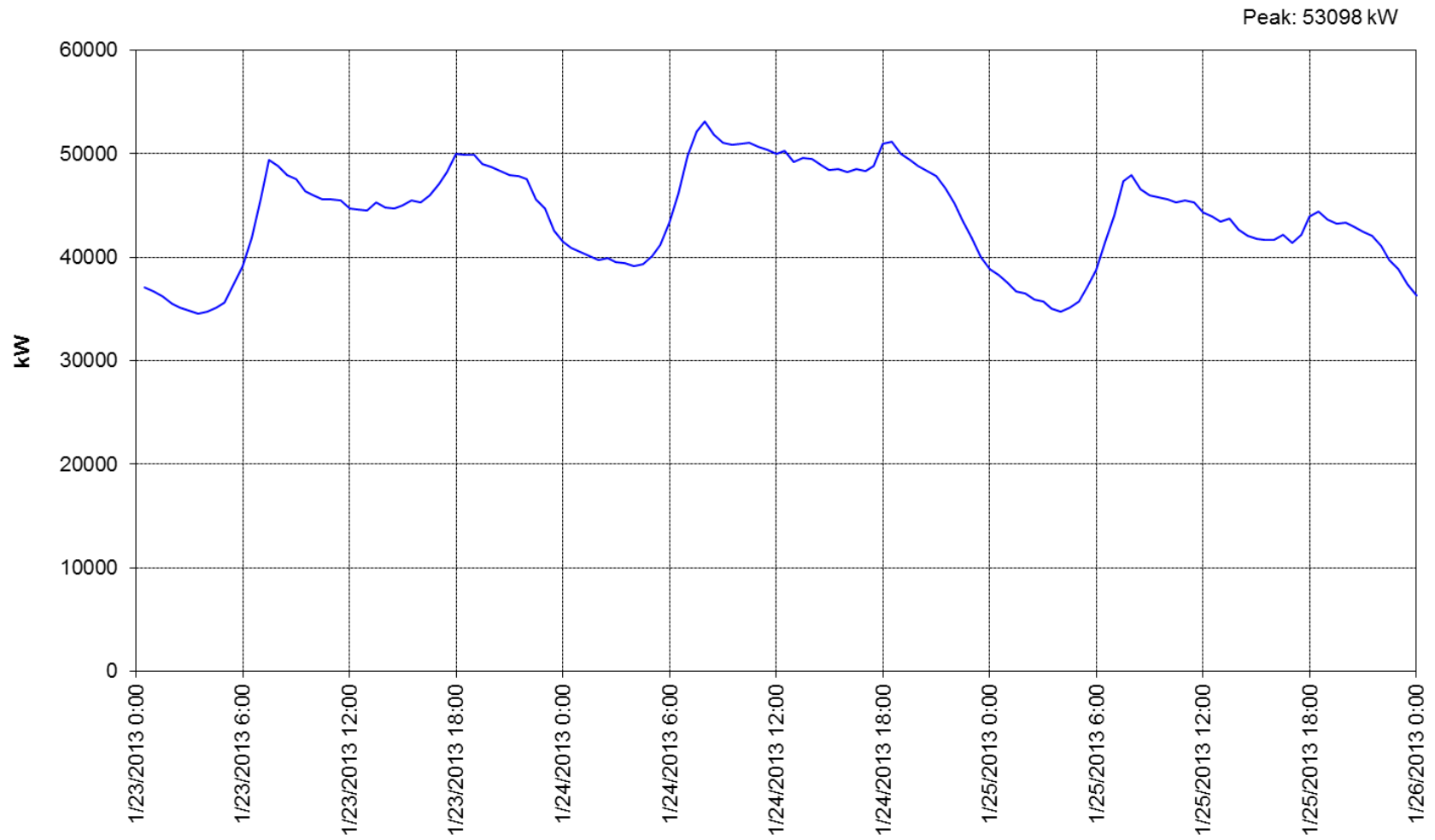
## Exhibit 6

### Brookings, SD Summer 2013 Half-Hour Load Shape - Town Gate



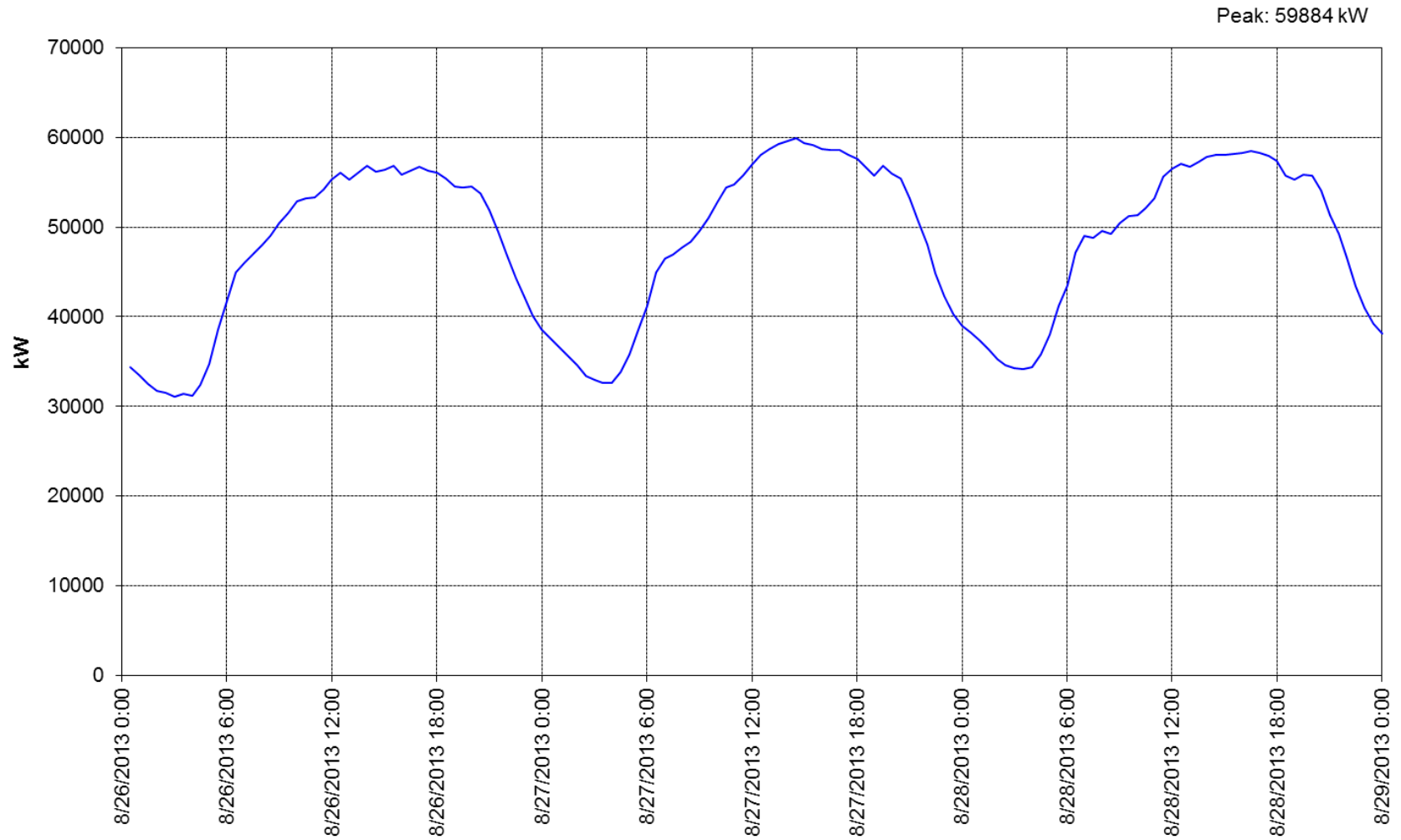
## Exhibit 7

Brookings, SD Peak Half-Hour Load Shape, Winter 2102-2013, Town Gate



## Exhibit 8

Brookings, SD Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Brookings is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Brookings to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Brookings has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2009	Cooling	BES	2	\$ 3,657	14.2	13,878
	Custom Lighting	BES	1	\$ 6,063	20.2	227,273
	Energy Star Appliance	BES	5	\$ 2,347	0.7	8,307
	Lighting	BES	1009	\$ 60,624	117.0	501,072
	Lighting - New Const	BES	51	\$ 4,080	7.5	32,793
	Motors	BES	2	\$ 3,900	0.9	4,493
	Res HVAC	BES	16	\$ 9,145	8.4	36,404
	VFDs and Pumps	BES	4	\$ 1,200	24.7	90,958
<b>2009 Total</b>			<b>1090</b>	<b>\$ 91,016</b>	<b>193.6</b>	<b>915,178</b>
2010	CI HVAC	BES	4	\$ 7,545	20.6	42,267
	Custom Electric Program	BES	6	\$ 12,729	39.9	78,503
	Energy Star Appliance	BES	206	\$ 8,293	2.5	34,109
	Food Service	BES	2	\$ 600	1.0	5,661
	Lighting - New Const	BES	145	\$ 9,520	49.8	167,943
	Lighting - Retrofit	BES	1990	\$ 69,146	204.3	764,567
	Res HVAC	BES	74	\$ 18,765	32.0	159,722
	VFDs and Pumps	BES	20	\$ 7,120	32.5	118,716
<b>2010 Total</b>			<b>2447</b>	<b>\$ 133,717</b>	<b>382.7</b>	<b>1,371,488</b>
2011	Custom Electric Program	BES	2	\$ 15,349	42.2	268,864
	Energy Star Appliance	BES	172	\$ 7,180	4.1	43,429
	Lighting - New Const	BES	96	\$ 7,680	59.4	117,731
	Lighting - Retrofit	BES	1199	\$ 20,558	56.6	254,418
	Res HVAC	BES	25	\$ 7,889	19.0	87,003
	VFDs and Pumps	BES	4	\$ 5,550	30.5	166,678
	Res Lighting	BES	8048	\$ 12,072	32.2	312,479
<b>2011 Total</b>			<b>9546</b>	<b>\$ 76,277</b>	<b>244.0</b>	<b>1,250,602</b>
2012	CI HVAC	BES	55	\$ 21,539	87.4	142,266
	Comm Refrigeration Audit	BES	2	\$ -	0.2	1,899
	Custom Electric Program	BES	8	\$ 8,348	27.7	158,854
	Energy Star Appliance	BES	207	\$ 7,161	3.6	41,575
	Food Service	BES	6	\$ 1,850	8.4	61,550
	Lighting - New Const	BES	560	\$ 4,465	12.6	60,850
	Lighting - Retrofit	BES	951	\$ 23,799	74.9	268,040
	Res HVAC	BES	43	\$ 7,150	11.9	66,765
	VFDs and Pumps	BES	6	\$ 3,040	17.2	71,267
<b>2012 Total</b>			<b>1838</b>	<b>\$ 77,351</b>	<b>243.9</b>	<b>873,066</b>
2013	CI HVAC	BES	9	\$ 10,844	20.4	40,193
	Compressed Air System	BES	2	\$ 2,925	8.8	38,698
	Custom Electric Program	BES	4	\$ 13,274	47.9	155,273
	Energy Star Appliance	BES	152	\$ 6,200	4.6	29,990
	Food Service	BES	2	\$ 300	0.3	2,518
	Lighting - New Const	BES	116	\$ 5,800	17.4	107,002
	Lighting - Retrofit	BES	2018	\$ 45,178	127.8	665,151
	Res HVAC	BES	114	\$ 9,175	41.0	53,379
	VFDs and Pumps	BES	4	\$ 1,320	6.5	22,353
	Res Lighting	BES	6000	\$ 7,800	29.4	262,800
	Comm Refrigeration	BES	21	\$ 2,025	4.3	46,457
<b>2013 Total</b>			<b>8442</b>	<b>\$ 104,841</b>	<b>308.4</b>	<b>1,423,814</b>
<b>Grand Total</b>			<b>23363</b>	<b>\$ 483,202</b>	<b>1,372.7</b>	<b>5,834,148</b>

## ***D. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Brookings was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

## ***E. Options Chosen – Development of Action Plan***

DSM software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or are planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

### ***i. Future Actions***

It is assumed that Brookings will continue to participate in the Bright Energy Solutions program. Brookings would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Brookings will participate in all of the Bright Energy Solutions programs to the extent possible.

Representatives from Brookings plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, it is unknown if Brookings will participate in the MRES Coordinated Demand Response (CDR) program in the future. That decision will be evaluated in years to come.

### ***ii. Milestones***

As part of the annual WAPA IRP updates, Brookings will evaluate the progress on these programs. The success will be measured against this 5-year plan, with adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and

program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

#### ***F. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will by definition decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

#### ***G. Public Participation***

A preliminary draft of this report was produced on April 29, 2014. The draft was reviewed by Brookings Municipal Utilities. A revised draft was completed on August 8, 2014. A notice of public hearing on IRP was published in the local newspaper on August 21, 2014 and August 28, 2014. The public hearing on the IRP was held at the September 8, 2014 Municipal Utilities Board meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The Municipal Utilities Board approved the resolution on September 8, 2014. A copy of the approved resolution is included in Appendix 2 at the end of this section.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b>4/29/2014</b>
Preliminary Draft Reviewed By	<b>8/8/2014</b>
Draft Revision Completion Date	<b>8/8/2014</b>
	<b>8/21/2014</b>
	<b>and</b>
Date Published in Paper	<b>8/28/2014</b>
Public Hearing Date	<b>9/8/2014</b>
Date Approved by City Council	<b>9/8/2014</b>



## Appendix 1 – Detailed DSM Measures Installed

Utility Brookings

Year	Program	Measure	BES or City	Quan	Incentive	kW	kWh
2009	Cooling	79.5 ton air cooled chiller	BES	1	\$ 3,657	13.5	11,178
		Chilled water resets	BES	1		0.7	2,700
					<b>\$ 3,657</b>	<b>14.2</b>	<b>13,878</b>
	Custom Lighting	Occup. Sensors	BES	1	\$ 6,063	20.2	227,273
					<b>\$ 6,063</b>	<b>20.2</b>	<b>227,273</b>
	Energy Star Appliance	Electrolux EWFLW65IRRO	BES	1	\$ 50	0.0	165
		LG WM2701HV	BES	1	\$ 50	0.0	165
		MVWB700VQO	BES	1	\$ 50	0.0	165
		Whirlpool GU2300XTV80	BES	1	\$ 25	0.0	144
		Whirlpool WPW9200SQAJ2	BES	1	\$ 50	0.0	165
		(blank)	BES	(blank)	\$ 2,122	0.6	7,503
					<b>\$ 2,347</b>	<b>0.7</b>	<b>8,307</b>
	Lighting	Occup. Sensors	BES	8	\$ 160	0.6	2,200
		T5 4' 2L	BES	32	\$ 288	2.5	5,696
		T5 HB 4L	BES	12	\$ 720	2.8	12,264
		T5 HB 6L	BES	39	\$ 3,510	5.7	25,077
		T5 HO 2L	BES	12	\$ 720	1.1	4,728
		T5HO 2L	BES	8	\$ 480	0.7	3,152
		T5HO HB 4L	BES	24	\$ 1,440	5.6	24,528
		T8 4' 2L	BES	13	\$ 286	0.2	715
				40	\$ 2,365	0.6	2,200
		T8 4' 3L	BES	75		2.3	8,925
		T8 4' 4L	BES	16		0.5	2,016
				100		3.3	12,600
		T8 HB 6L	BES	16	\$ 1,036	2.4	10,288
				21	\$ 3,045	6.2	27,006
				24	\$ 2,040	3.5	15,432
				27	\$ 2,615	4.0	17,361
				493	\$ 41,905	72.5	316,999
		CFL Fixtures and Lamps	BES	9	\$ 14	0.3	1,107
				19		2.3	8,778
					<b>\$ 60,624</b>	<b>117.0</b>	<b>501,072</b>
	Lighting - New Const	T5 HO 6L	BES	29	\$ 2,320	4.3	18,647
		T5HO 6L	BES	22	\$ 1,760	3.2	14,146
					<b>\$ 4,080</b>	<b>7.5</b>	<b>32,793</b>
	Motors	125HP motor	BES	1	\$ 500	0.6	3,305
		40HP Motor	BES	1	\$ 3,400	0.3	1,188
					<b>\$ 3,900</b>	<b>0.9</b>	<b>4,493</b>
	Res HVAC	15 SEER HP	BES	1	\$ 400	0.1	76
		15.5 SEER HP	BES	1	\$ 650	0.4	228
		17.4 EER GSHP	BES	1	\$ 1,663	0.1	3,555

		17.8 EER GSHP	BES	1	\$	2,020	0.1	3,555
		5 ton 17.4 SEER GSHP	BES	1	\$	1,663	2.5	13,703
		AC 16 SEER	BES	1	\$	100	0.2	90
		Desuperheater	BES	1			0.7	2,442
		ECM motor-gas	BES	1	\$	150	0.2	811
		ECM-gas furnace	BES	1	\$	700	0.5	2,433
		ECM-HP	BES	1			0.3	1,936
		(blank)	BES	(blank)	\$	1,800	3.4	7,575
					\$	<b>9,145</b>	<b>8.4</b>	<b>36,404</b>
<b>VFDs and Pumps</b>		15HP VFDs	BES	2	\$	1,200	6.7	24,806
		40HP VFD	BES	2			18.0	66,152
					\$	<b>1,200</b>	<b>24.7</b>	<b>90,958</b>
<b>2009 Total</b>					\$	<b>91,016</b>	<b>193.6</b>	<b>915,178</b>
<b>2010</b>	<b>CI HVAC</b>	Air Cooled Chiller	BES	1	\$	6,000	20.3	19,665
		GS HP_Closed Loop Water to Air	BES	2	\$	1,545	0.4	22,602
					\$	<b>7,545</b>	<b>20.6</b>	<b>42,267</b>
	<b>Custom Electric Program</b>	Custom	BES	2	\$	10,970	35.0	48,363
		Geothermal water to water heat pump for domestic hot water.	BES	1	\$	1,759	4.9	30,140
					\$	<b>12,729</b>	<b>39.9</b>	<b>78,503</b>
	<b>Energy Star Appliance</b>	Energy Star Clothes Washer	BES	3	\$	150	0.1	675
				5	\$	750	0.3	3,307
				7	\$	700	0.3	2,951
				9	\$	450	0.2	2,025
				10	\$	500	0.2	2,250
				14	\$	700	0.3	2,752
				18	\$	900	0.3	3,254
				19	\$	950	0.4	4,275
				31	\$	1,550	0.4	4,587
		Energy Star Decorative Lights	BES	5	\$	18	0.0	42
		Energy Star Dehumidifier	BES	1	\$	30	0.1	264
				2	\$	20	0.0	176
		Energy Star Dishwasher	BES	1	\$	50	0.0	154
				2	\$	150	0.0	822
				3	\$	75	0.0	411
				4	\$	100	0.0	548
				6	\$	300	0.0	1,464
				8	\$	200	0.0	1,096
				28	\$	700	0.0	3,056
					\$	<b>8,293</b>	<b>2.5</b>	<b>34,109</b>
<b>Food Service</b>		ES Holding Cabinets	BES	2	\$	600	1.0	5,661
					\$	<b>600</b>	<b>1.0</b>	<b>5,661</b>
	<b>Lighting - New Const</b>	Ltng New Const _ T5HO 4ft Hi Bay Fixture	BES	97	\$	6,640	35.8	98,137
		Ltng New Const _ T8 4ft Hi Bay Fixture	BES	48	\$	2,880	13.9	69,806
					\$	<b>9,520</b>	<b>49.8</b>	<b>167,943</b>
	<b>Lighting - Retrofit</b>	Ltng Retrofit _ LED & Induction Tech	BES	5	\$	60	0.1	832
				6	\$	72	0.1	999
				20	\$	240	0.4	3,329
		Ltng Retrofit _ Othr Eff Ltng Tech/Unit	BES	52	\$	1,740	4.3	12,245

				175	\$	4,600	15.4	68,240
	Ltng Retrofit _Flrsct T8 & T5 w/Elec Bal	BES		4	\$	44	0.1	458
				60	\$	720	2.1	6,153
				100	\$	964	2.3	5,368
				1046	\$	20,876	63.4	206,676
	Ltng Retrofit _ T8 Hi Bay Fixtures w-Elec Bal	BES		21	\$	1,785	4.7	11,051
				483	\$	36,785	109.9	444,246
	Ltng Retrofit _ T5HO Hi Bay Fixtures w-Elec Bal	BES		18	\$	1,260	1.5	4,970
					\$	69,146	204.3	764,567
Res HVAC	Air Handler _ Fan Coil with ECM	BES		1	\$	900	1.4	2,400
	Desuperheater	BES		1	\$	250	0.4	1,221
				2	\$	1,500	2.9	7,326
	HVAC Air_Source HP	BES		1	\$	1,000	1.6	7,924
				2	\$	1,000	1.6	7,924
	HVAC Central AC unit	BES		1	\$	100	0.2	162
				3	\$	900	2.5	1,778
				4	\$	400	1.0	702
	HVAC Closed Loop Water to Air GS HP	BES		2	\$	3,978	5.3	65,772
	HVAC HE Furnace with ECM	BES		1	\$	600	0.9	1,600
				2	\$	1,200	1.8	3,200
				3	\$	1,350	2.1	3,600
				5	\$	750	1.2	2,000
	HVAC Air-Source Heat Pump	BES		1	\$	250	0.2	1,581
				2	\$	500	0.4	3,162
				3	\$	750	0.6	4,743
	HVAC Ground_Source HP Closed Loop	BES		1	\$	743	1.2	10,558
				2	\$	2,595	6.7	34,069
					\$	18,765	32.0	159,722
VFDs and Pumps	Variable Freq Drives	BES		6	\$	4,500	20.7	79,797
				8	\$	2,070	11.2	35,942
	Replace on Failure 3 Phase _ 1800 RPM	BES		1	\$	75	0.1	381
				3	\$	325	0.4	1,890
	Replace on Failure 3 Phase _ 1200 RPM	BES		2	\$	150	0.1	706
					\$	7,120	32.5	118,716
<b>2010 Total</b>					\$	133,717	382.7	1,371,488
2011	Custom Electric Program							
	pneumatic controls on 2 air handlers and 5 VAVs	BES		1	\$	5,698	14.5	134,752
	replaced 75HP rotary screw compressor w 40HP VFD compressor.	BES		1	\$	9,651	27.7	134,112
					\$	15,349	42.2	268,864
	Energy Star Appliance							
	Energy Star Clothes Washer	BES		1	\$	100	0.0	476
				3	\$	300	0.1	1,350
				4	\$	200	0.1	900
				5	\$	250	0.1	1,125
				6	\$	900	0.4	4,050
				7	\$	700	0.3	3,150
				8	\$	400	0.2	1,800
				10	\$	500	0.2	2,250
	Energy Star Dehumidifier	BES		1	\$	10	0.0	88

			2	\$	40	0.1	352
			3	\$	30	0.1	264
	Energy Star Dishwasher	BES	1	\$	50	0.0	274
			2	\$	150	0.0	822
			3	\$	75	0.0	411
			5	\$	250	0.0	1,370
			6	\$	150	0.0	822
			7	\$	175	0.0	959
			8	\$	200	0.0	1,096
	Energy Star Refrigerators	BES	1	\$	50	0.0	405
			2	\$	100	0.1	810
			3	\$	300	0.3	2,430
			6	\$	600	0.6	4,860
			7	\$	700	0.6	5,670
			9	\$	450	0.4	3,645
			10	\$	500	0.5	4,050
				\$	<b>7,180</b>	<b>4.1</b>	<b>43,429</b>
Lighting - New Const	Ltng NC _ T5HO 4ft Hi Bay Fixture	BES	96	\$	7,680	59.4	117,731
				\$	<b>7,680</b>	<b>59.4</b>	<b>117,731</b>
Lighting - Retrofit	Ltng Retro _ CFL Fixtures & Lamps	BES	32	\$	48	1.3	3,177
	Ltng Retro _ LED & Induction Tech	BES	1	\$	12	0.0	166
			6	\$	72	0.1	999
	Ltng Retro _ Othr Eff Ltg Tech/Ctld	BES	1	\$	1,710	5.2	87,008
	Ltng Retro _ Othr Eff Ltg Tech/Unit	BES	30	\$	1,200	2.9	8,387
	Ltng Retro _ Rducd Wtg T8 CEE Qual	BES	145	\$	2,394	9.4	25,531
	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	15	\$	1,275	3.3	8,274
			53	\$	4,505	11.8	55,742
	Ltng Retro _ Flrsct T8 & T5 w/Elec Bal	BES	3	\$	75	0.2	886
			14	\$	182	0.4	1,070
			22	\$	242	0.7	2,516
			31	\$	396	1.2	3,317
			135	\$	1,485	3.9	9,351
			470	\$	4,802	11.9	29,197
	Ltng Retro _ Rducd Wtg T8 Fixture	BES	240	\$	2,160	4.1	18,797
				\$	<b>20,558</b>	<b>56.6</b>	<b>254,418</b>
Res HVAC	Air Handler _ Fan Coil with ECM	BES	1	\$	150	0.2	400
	Desuperheater	BES	1	\$	500	1.1	2,442
			2	\$	500	1.1	2,442
	HVAC Central AC unit	BES	1	\$	400	1.2	868
			2	\$	200	0.7	473
	HVAC Closed Loop Water to Air GS HP	BES	1	\$	2,691	6.9	37,151
			2	\$	2,273	6.0	31,711
	HVAC HE Furnace with ECM	BES	1	\$	300	0.5	800
			2	\$	600	0.9	1,600
	HVAC Mini Split _ Ductless Air _ Source HP	BES	1	\$	200	0.4	6,470
	Programmable Thermostat - Elec Heat w/AC	BES	1	\$	25	0.0	2,272
	Programmable Thermostat - NON Elec-Gas w/AC	BES	1	\$	50	0.0	374
				\$	<b>7,889</b>	<b>19.0</b>	<b>87,003</b>

<b>VFDs and Pumps</b>		Repl on Fail 3 Phase _ 1800 RPM	<b>BES</b>	2	\$ 150	0.1	564
		Variable Freq Drives	<b>BES</b>	1	\$ 4,000	26.0	138,554
		VFD Air Compressor	<b>BES</b>	1	\$ 1,400	4.4	27,560
					<b>\$ 5,550</b>	<b>30.5</b>	<b>166,678</b>
<b>Res Lighting</b>		CFL Fixtures and Lamps	<b>BES</b>	8048	\$ 12,072	32.2	312,479
					<b>\$ 12,072</b>	<b>32.2</b>	<b>312,479</b>
<b>2011 Total</b>					<b>\$ 76,277</b>	<b>244.0</b>	<b>1,250,602</b>
<b>2012</b>	<b>CI HVAC</b>	Air Cooled Chiller	<b>BES</b>	1	\$ 8,200	27.7	43,298
		Demand Controlled Ventilation	<b>BES</b>	1	\$ 1,559	5.2	8,550
		Guest Room Energy Management (GREM)	<b>BES</b>	19	\$ 665	1.8	25,688
		Setback/Programmable Thermostats	<b>BES</b>	2	\$ 100	0.0	1,764
				6	\$ 600	0.0	10,224
		Unitary Single Pkgd AC	<b>BES</b>	1	\$ 975	5.0	4,789
				19	\$ 9,440	47.8	47,953
					<b>\$ 21,539</b>	<b>87.4</b>	<b>142,266</b>
<b>Comm Refrigeration Audit</b>		Coil Cleaning kit	<b>BES</b>	1	\$ -	0.2	1,488
		LED Screw-in Replacement Lamp	<b>BES</b>	1	\$ -	0.0	411
					<b>\$ -</b>	<b>0.2</b>	<b>1,899</b>
<b>Custom Electric Program</b>		Custom	<b>BES</b>	1	\$ 3,899	12.9	124,830
		Custom Lighting	<b>BES</b>	1	\$ 4,449	14.8	34,024
					<b>\$ 8,348</b>	<b>27.7</b>	<b>158,854</b>
<b>Energy Star Appliance</b>		Energy Star Ceiling Fans	<b>BES</b>	1	\$ 50	0.2	302
				7	\$ 175	0.6	1,057
		Energy Star Clothes Washer	<b>BES</b>	2	\$ 200	0.1	900
				3	\$ 300	0.1	1,350
				4	\$ 1,000	0.4	4,500
				5	\$ 250	0.1	1,125
				8	\$ 400	0.2	1,800
				9	\$ 450	0.2	2,025
		Energy Star Decorative Lights	<b>BES</b>	6	\$ 21	0.0	152
		Energy Star Dehumidifier	<b>BES</b>	1	\$ 40	0.1	352
		Energy Star Dishwasher	<b>BES</b>	1	\$ 75	0.0	411
				2	\$ 50	0.0	274
				3	\$ 300	0.0	1,644
				4	\$ 100	0.0	548
				5	\$ 125	0.0	685
				8	\$ 200	0.0	1,096
				67	\$ 1,675	0.0	9,179
		Energy Star Refrigerators	<b>BES</b>	1	\$ 50	0.0	405
				2	\$ 300	0.3	2,430
				3	\$ 300	0.3	2,430
				5	\$ 750	0.7	6,075
				7	\$ 350	0.3	2,835
					<b>\$ 7,161</b>	<b>3.6</b>	<b>41,575</b>
<b>Food Service</b>		ES Comm Dishwasher_Elec WH-Elec Boost	<b>BES</b>	1	\$ 1,000	3.7	32,650
		ES Comm Solid Door Freezers	<b>BES</b>	1	\$ 150	0.2	1,728
		ES Comm Solid Door Refrigerators	<b>BES</b>	1	\$ 100	0.1	470

	ES Convection Ovens _ Electric Only	BES	2	\$	400	4.2	25,050
	ES Ice Machines	BES	1	\$	200	0.2	1,652
				\$	<b>1,850</b>	<b>8.4</b>	<b>61,550</b>
Lighting - New Const	Ltng NC _ Hi Bay Occupancy Sensor	BES	19	\$	190	0.6	10,201
	Ltng NC _ T8 4ft Hi Bay Fixture	BES	19	\$	950	2.8	17,526
	Ltng NC_Low Watt T8 Fixture	BES	522	\$	3,325	9.2	33,123
				\$	<b>4,465</b>	<b>12.6</b>	<b>60,850</b>
Lighting - Retrofit	Ltng Retro _ CFL Fixtures & Lamps	BES	24	\$	36	1.1	3,935
	Ltng Retro _ Flrsct T8 & T5 w/Elec Bal	BES	4	\$	52	0.1	488
			12	\$	356	1.1	3,558
			19	\$	247	0.6	2,318
			36	\$	265	0.7	2,402
			39	\$	451	1.4	4,203
			176	\$	2,288	7.1	19,180
	Ltng Retro _ Hi Perf T8 Replacing Specific Fixtures	BES	54	\$	1,620	4.1	35,571
			56	\$	1,680	3.3	9,318
	Ltng Retro _ LED & Induction Tech	BES	6	\$	72	0.1	999
			47	\$	705	2.6	7,075
			63	\$	945	3.5	9,483
			71	\$	1,065	3.9	10,687
	Ltng Retro _ Othr Eff Ltg Tech/Ctld	BES	1	\$	440	1.3	9,541
			9	\$	90	0.3	6,729
	Ltng Retro _ Othr Eff Ltg Tech/Unit	BES	18	\$	640	1.9	10,750
			31	\$	1,240	3.9	34,306
	Ltng Retro _ Rducd Wtg Flr T8 and T5HO Lamps	BES	40	\$	20	0.1	283
			45	\$	23	0.2	521
	Ltng Retro _ Rducd Wtg T8 CEE Qual	BES	21	\$	378	1.2	4,564
			47	\$	846	3.3	9,123
	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	9	\$	765	2.0	17,118
			111	\$	9,575	31.0	65,888
				\$	<b>23,799</b>	<b>74.9</b>	<b>268,040</b>
Res HVAC	Air Handler _ Fan Coil with ECM	BES	3	\$	450	0.7	1,200
	Desuperheater	BES	1	\$	500	1.1	2,442
	HVAC Air_Source HP - 14.5 SEER	BES	1	\$	500	0.4	3,162
	HVAC Central AC unit	BES	1	\$	300	1.5	871
			2	\$	200	1.9	1,022
			3	\$	600	2.4	1,392
	HVAC Closed Loop Water to Water GS HP	BES	1	\$	2,400	0.7	45,204
	HVAC HE Furnace with ECM	BES	1	\$	750	1.2	2,000
			2	\$	1,200	1.8	3,200
	Programmable Thermostat - Geothermal	BES	1	\$	25	0.0	882
			4	\$	100	0.0	3,528
	Programmable Thermostat - Heat Pump	BES	1	\$	25	0.0	1,114
	Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	BES	1	\$	100	0.2	748
				\$	<b>7,150</b>	<b>11.9</b>	<b>66,765</b>
VFDs and Pumps	Hi_Eff Pumps	BES	2	\$	400	0.0	3,540
	Variable Freq Drives	BES	4	\$	2,640	17.2	67,727

					\$ 3,040	17.2	71,267
<b>2012 Total</b>					\$ 77,351	243.9	873,066
<b>2013</b>	<b>CI HVAC</b>	Air Cooled Chillers w-Condenser	BES	1	\$ 2,644	4.8	27,922
		Setback/Programmable Thermostats	BES	2	\$ 100	0.0	1,644
		Unitary Air Cooled Split Sys AC <65k Btuh (1ph)	BES	3	\$ 500	0.7	828
		Unitary Air Cooled Split Sys AC 241k - 760k Btuh	BES	3	\$ 7,600	14.9	9,799
					\$ 10,844	20.4	40,193
	<b>Compressed Air System</b>	Cycling Refrigerated Dryers	BES	1	\$ 300	0.8	3,448
		VFD Air Compressor	BES	1	\$ 2,625	7.9	35,250
					\$ 2,925	8.8	38,698
	<b>Custom Electric Program</b>	Custom Lighting	BES	1	\$ 13,274	47.9	155,273
					\$ 13,274	47.9	155,273
	<b>Energy Star Appliance</b>	Energy Star Ceiling Fans	BES	1	\$ 25	0.1	151
		Energy Star Clothes Washer	BES	1	\$ 50	0.0	131
				3	\$ 150	0.1	393
				4	\$ 600	0.2	1,572
				5	\$ 250	0.1	655
				6	\$ 600	0.2	1,572
				7	\$ 350	0.1	917
				8	\$ 400	0.1	1,048
				9	\$ 450	0.2	1,179
		Energy Star Decorative Lights	BES	10	\$ 35	0.0	782
		Energy Star Dishwasher	BES	1	\$ 50	0.1	120
				2	\$ 50	0.1	120
				3	\$ 225	0.3	540
				4	\$ 300	0.4	720
				5	\$ 250	0.4	600
		Energy Star Refrigerators	BES	2	\$ 200	0.2	1,620
				3	\$ 450	0.4	3,645
				4	\$ 400	0.4	3,240
				7	\$ 700	0.6	5,670
				13	\$ 650	0.6	5,265
		Energy Star Room AC	BES	1	\$ 15	0.1	50
					\$ 6,200	4.6	29,990
	<b>Food Service</b>	ES Comm Solid Door Freezers	BES	1	\$ 150	0.2	1,728
		ES Comm Solid Door Refrigerators	BES	1	\$ 150	0.1	790
					\$ 300	0.3	2,518
	<b>Lighting - New Const</b>	T8 4ft Hi Bay Fixture	BES	116	\$ 5,800	17.4	107,002
					\$ 5,800	17.4	107,002
	<b>Lighting - Retrofit</b>	High Bay Fluorescent Occ Sensors	BES	1	\$ 2,100	6.5	106,858
				2	\$ 1,110	3.4	57,676
		LED & Induction Tech	BES	1	\$ 12	0.0	166
				15	\$ 213	0.6	3,111
				16	\$ 231	0.8	1,903
				97	\$ 1,455	4.5	16,347
		Othr Eff Ltg Tech - per Unit	BES	10	\$ 200	0.7	1,662
				29	\$ 1,100	2.7	7,703

			40	\$	1,280	4.2	21,818
	Rduc'd Wtg T8 Lamps ONLY	BES	4	\$	4	0.0	52
			28	\$	28	0.1	363
	Reduced Wtg T8 4ft CEE Qual	BES	18	\$	324	1.3	3,494
			176	\$	2,961	9.1	23,644
			210	\$	3,769	15.2	75,903
	T8 4ft w/ Bal Repl 8ft T12 HO	BES	12	\$	360	0.9	2,187
			16	\$	480	1.3	4,880
			18	\$	540	1.4	8,515
			21	\$	630	1.6	4,012
			31	\$	930	2.6	9,210
			210	\$	6,300	16.2	95,655
	T8 4ft w/Elec Bal	BES	2	\$	12	0.0	107
			5	\$	44	0.1	489
			11	\$	143	0.4	1,334
			13	\$	134	0.3	1,243
			62	\$	491	1.0	5,182
			72	\$	719	2.2	15,958
			137	\$	1,186	3.0	10,882
			174	\$	1,597	4.6	12,913
			209	\$	2,181	5.6	20,589
	CFL Fixtures and Lamps	BES	9	\$	50	0.7	2,958
			64	\$	1,152	2.3	10,155
			128	\$	332	4.2	18,489
	T5HO Hi Bay Fixtures w/ 4ft Lamps	BES	27	\$	1,890	2.5	5,803
	T8 Hi Bay Fixtures w/ 4ft Lamps	BES	3	\$	255	0.7	1,655
			18	\$	1,530	4.0	9,929
			27	\$	2,295	6.0	14,894
			34	\$	2,380	4.6	10,921
			56	\$	4,760	12.4	76,491
				\$	45,178	127.8	665,151
Res HVAC	HVAC Central AC unit	BES	1	\$	500	4.1	2,244
			2	\$	200	1.4	783
			4	\$	400	3.0	1,662
			41	\$	4,100	23.5	12,835
	HVAC HE Furnace with ECM	BES	1	\$	600	0.9	1,600
			2	\$	300	0.5	800
			3	\$	450	0.7	1,200
			4	\$	600	0.9	1,600
	HVAC HP Water Heater	BES	1	\$	300	0.3	2,830
	HVAC Mini Split_Ductless Air_Source						
	HP	BES	1	\$	200	0.4	6,470
			2	\$	400	0.9	12,940
	Programmable Thermostat - Propane,						
	Fuel Oil, Boiler w/AC	BES	1	\$	50	0.2	374
			2	\$	50	0.2	374
			41	\$	1,025	4.0	7,667
				\$	9,175	41.0	53,379
VFDs and Pumps	Hi_Eff Pumps	BES	2	\$	520	1.3	4,720
	Variable Freq Drives	BES	2	\$	800	5.2	17,633
				\$	1,320	6.5	22,353



<b>Res Lighting</b>	CFL Fixtures and Lamps	<b>BES</b>	6000	\$ 7,800	29.4	262,800
				<b>\$ 7,800</b>	<b>29.4</b>	<b>262,800</b>
<b>Comm Refrigeration</b>	ECM Fan Motor for Cooler-Freezer	<b>BES</b>	20	\$ 1,200	2.7	32,300
	LED Vertical Reach-in Refrigerated Case	<b>BES</b>	1	\$ 825	1.6	14,157
	Lighting			<b>\$ 2,025</b>	<b>4.3</b>	<b>46,457</b>
<b>2013 Total</b>				<b>\$ 104,841</b>	<b>308.4</b>	<b>1,423,814</b>
<b>Grand Total</b>				<b>\$ 483,202</b>	<b>1,372.7</b>	<b>5,834,148</b>

## Appendix 2 – Brookings Resolution

RESOLUTION NO. 23 - 14

### RESOLUTION APPROVING INTEGRATED RESOURCE PLAN

WHEREAS the Brookings Municipal Utilities purchases a significant portion of its power supply from the Western Area Power Administration (Western); and

WHEREAS, Western has recently published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing of an Integrated Resource Plan (IRP); and

WHEREAS, the municipal utility staff has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and

WHEREAS, our customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and

WHEREAS, any public comments received have been addressed in order to strengthen the city's Integrated Resource Plan; and

WHEREAS, the IRP Summary Report included 5-year and 2-year action plans outlining actions to be taken by the Municipal Utility during the next several years.

NOW, THEREFORE, BE IT RESOLVED BY the Brookings Municipal Utilities Board as follows:

That the "Integrated Resource Plan Summary Report for the City of Brookings dated September 2014 shall be approved for filing with Western under the Energy Planning and Management Program."

Adopted this 8<sup>th</sup> day of September, 2014.

ATTEST:

  
\_\_\_\_\_  
Tim Harvey, Secretary

  
\_\_\_\_\_  
Steven Myers, President

## **IV. Flandreau, SD Resource Planning**

### **A. *City Information***

Flandreau, located in Moody County, is a community of more than 2,300 individuals located in eastern South Dakota. The residential sector includes 1,091 housing units. The median age of the population is 38.4 years. About 18.6% of the population is 65 years of age or older and about 25.9% percent are under 18 years old. In 2012, the municipal utility had 1,063 residential customers, 291 commercial customers, and 4 industrial customers. The residential sector's yearly usage averaged 10,181 kWh per customer in 2012. Commercial customers averaged 56,399 kWh, and industrial customers averaged 62,000 kWh.

The rates for each type of customer are shown on in the Exhibit 1. As of January 2014, the residential sector was charged 7.3 cents per kWh, and received a fixed customer charge of \$11.44. Small commercial customers were charged 7.9 cents per kWh, and received a fixed customer charge of \$20.18. Large commercial customers were charged 3.7 cents per kWh and received a fixed service charge of \$50.32. Additionally, large commercial customers also paid a demand charge of \$11.57 per kW.

Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4 show the winter and summer peak demand and energy for 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Flandreau on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 5,467 kW in the winter and 6,502 kW in the summer. Exhibits 7 and 8 each show the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load remaining flat from midnight to 6 am then increasing till roughly 9 am. Then loads begin to decline until 4 pm with a quick upswing until 6 pm. Loads then fall again until 8 am the next day. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline occurs until 6 am the next day.

## Exhibit 1

### FLANDREAU, SOUTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$11.44
	\$/kWh	\$.073
Small Commercial	Customer Charge	\$20.18
	\$/kWh	\$.079
Large Commercial	Customer Charge	\$50.32
	\$/kWh	\$.037
	\$/kW	\$11.57

## Exhibit 2

MRES Seasonal Load Report  
Flandreau, SD  
Town Gate Load  
BASE Forecast

1/31/14 2:14 PM

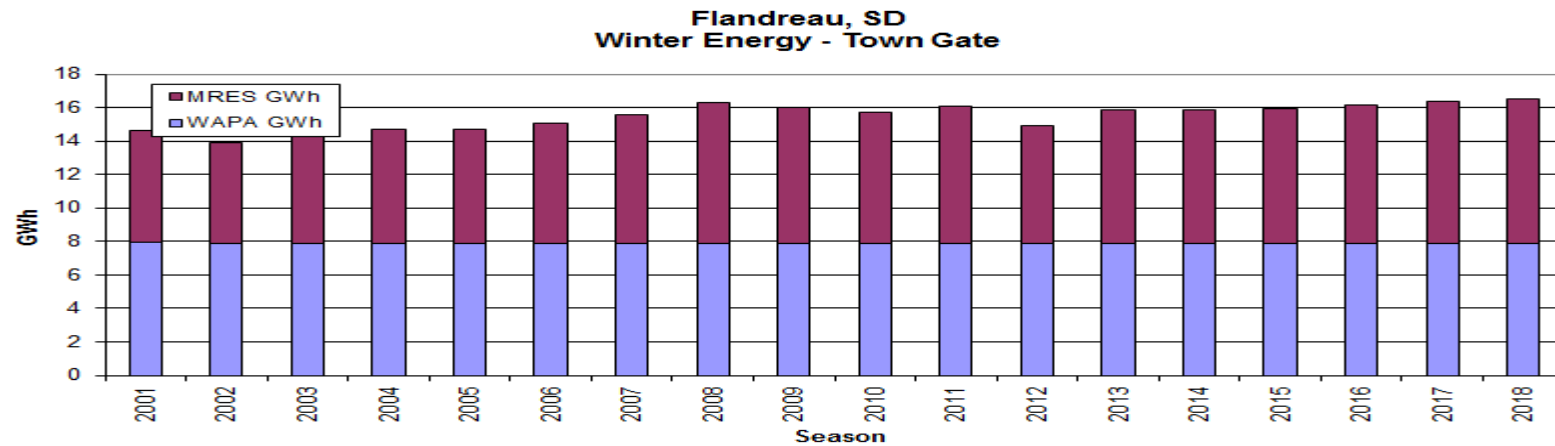
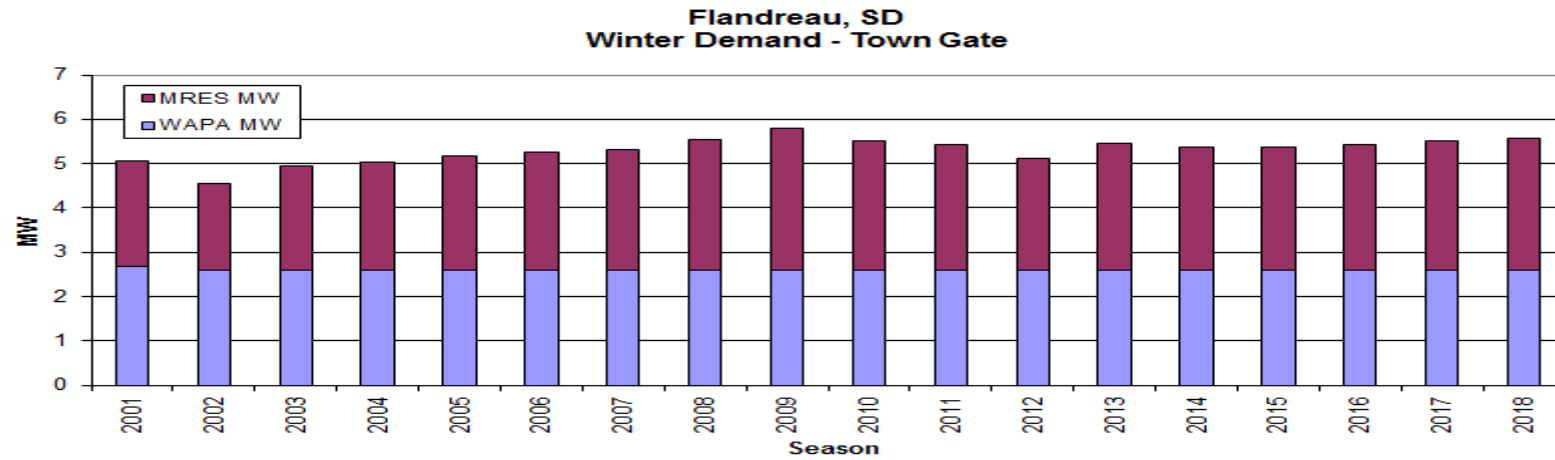
Town Gate Load

Monthly Splits

Historic Through 12/2013

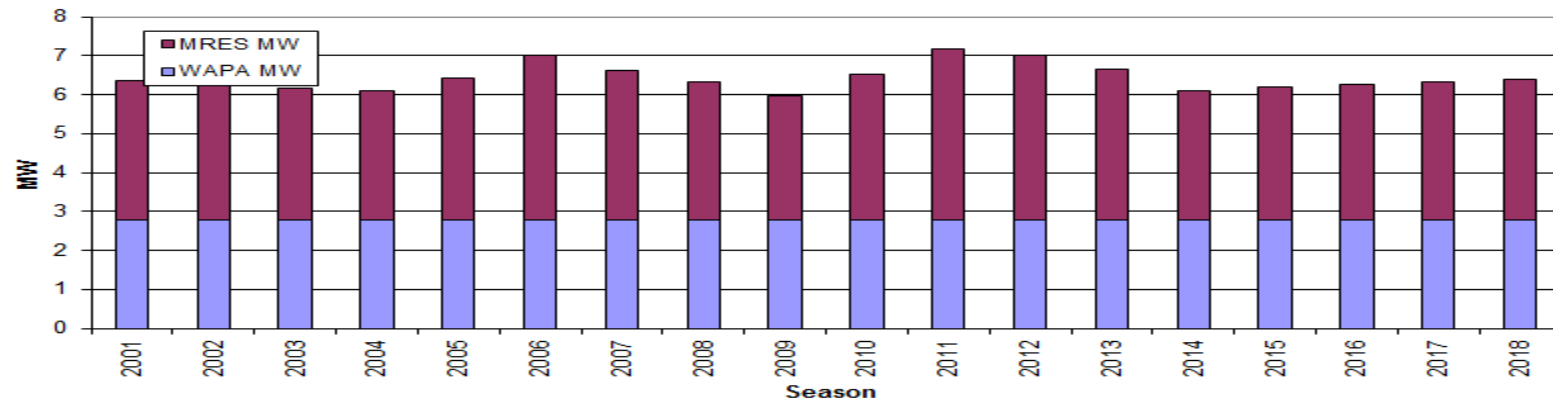
Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	5,886	2,789	3,577	0	2001	13,705,755	6,763,000	6,942,755	0
2002	5,848	2,789	3,539	0	2002	13,872,787	6,763,000	7,109,787	0
2003	5,692	2,789	3,373	0	2003	13,598,060	6,763,000	6,835,060	0
2004	5,630	2,789	3,321	0	2004	13,168,770	6,763,000	6,405,770	0
2005	5,949	2,789	3,640	0	2005	14,477,422	6,763,000	7,714,422	0
2006	6,532	2,784	4,227	0	2006	14,636,060	6,751,000	7,885,060	0
2007	6,148	2,784	3,843	0	2007	14,577,580	6,751,000	7,826,580	0
2008	5,858	2,784	3,553	0	2008	13,981,424	6,751,000	7,230,424	0
2009	5,430	2,784	3,180	0	2009	13,568,349	6,751,000	6,817,349	0
2010	6,200	2,784	3,729	0	2010	14,605,558	6,751,000	7,854,558	0
2011	6,690	2,784	4,385	0	2011	14,473,307	6,751,000	7,722,307	0
2012	6,541	2,784	4,236	0	2012	15,050,148	6,751,000	8,299,148	0
2013	6,502	2,784	3,854	0	2013	14,789,088	6,751,000	8,038,088	0
2014	5,792	2,784	3,321	0	2014	14,158,107	6,751,000	7,407,107	0
2015	5,869	2,784	3,395	0	2015	14,344,916	6,751,000	7,593,916	0
2016	5,945	2,784	3,468	0	2016	14,531,758	6,751,000	7,780,758	0
2017	6,021	2,784	3,541	0	2017	14,718,634	6,751,000	7,967,634	0
2018	6,098	2,784	3,615	0	2018	14,905,546	6,751,000	8,154,546	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	4,500	2,605	1,938	0	2002	13,890,327	7,858,000	6,032,327	0
2003	4,946	2,605	2,341	0	2003	14,569,638	7,858,000	6,711,638	0
2004	5,028	2,605	2,423	0	2004	14,709,262	7,909,000	6,800,262	0
2005	5,174	2,605	2,569	0	2005	14,666,596	7,858,000	6,808,596	0
2006	5,223	2,599	2,661	0	2006	15,049,274	7,846,000	7,203,274	0
2007	5,192	2,599	2,724	0	2007	15,590,766	7,840,000	7,750,766	0
2008	5,547	2,599	2,948	0	2008	16,289,895	7,891,000	8,398,895	0
2009	5,762	2,599	3,206	0	2009	15,973,011	7,840,000	8,133,011	0
2010	5,485	2,599	2,905	0	2010	15,720,590	7,840,000	7,880,590	0
2011	5,374	2,599	2,818	0	2011	16,082,769	7,840,000	8,242,769	0
2012	5,129	2,599	2,530	0	2012	14,906,299	7,891,000	7,015,299	0
2013	5,467	2,599	2,868	0	2013	15,858,832	7,840,000	8,018,832	0
2014	5,330	2,599	2,774	0	2014	15,893,603	7,840,000	8,053,603	0
2015	5,364	2,599	2,765	0	2015	15,917,624	7,840,000	8,077,624	0
2016	5,433	2,599	2,834	0	2016	16,125,875	7,890,750	8,235,125	0
2017	5,503	2,599	2,904	0	2017	16,334,163	7,840,000	8,494,163	0
2018	5,573	2,599	2,974	0	2018	16,542,492	7,840,000	8,702,492	0

### Exhibit 3

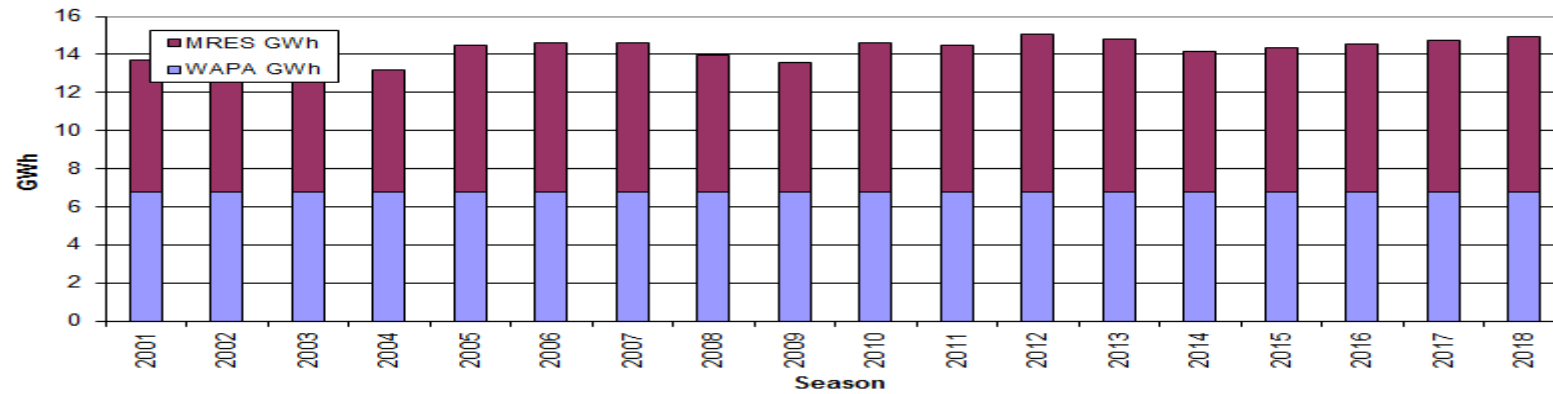


## Exhibit 4

**Flandreau, SD  
Summer Demand - Town Gate**

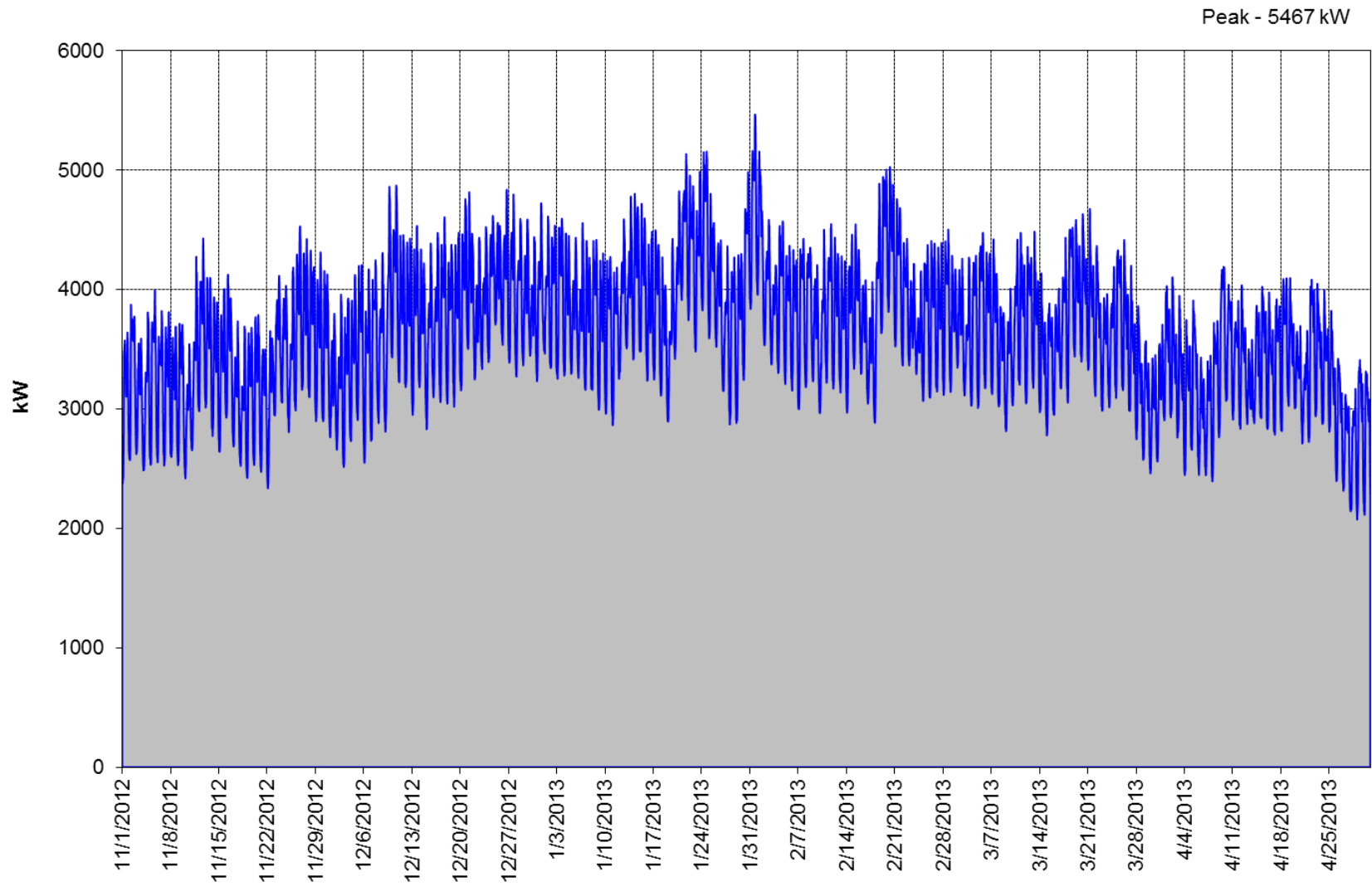


**Flandreau, SD  
Summer Energy - Town Gate**



## Exhibit 5

Flandreau, SD Winter 2012-2013 Half-Hour Load Shape - Town Gate

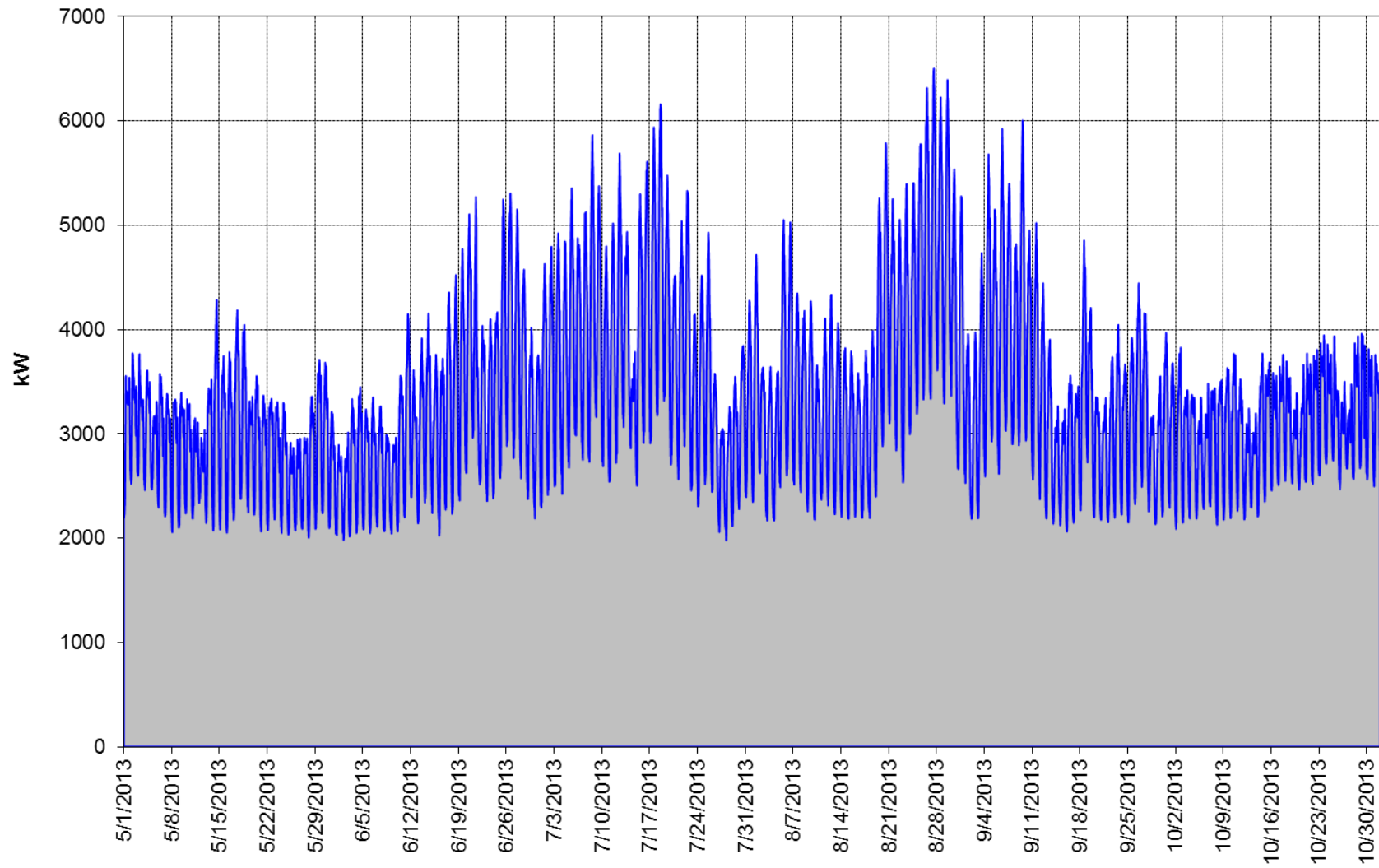




## Exhibit 6

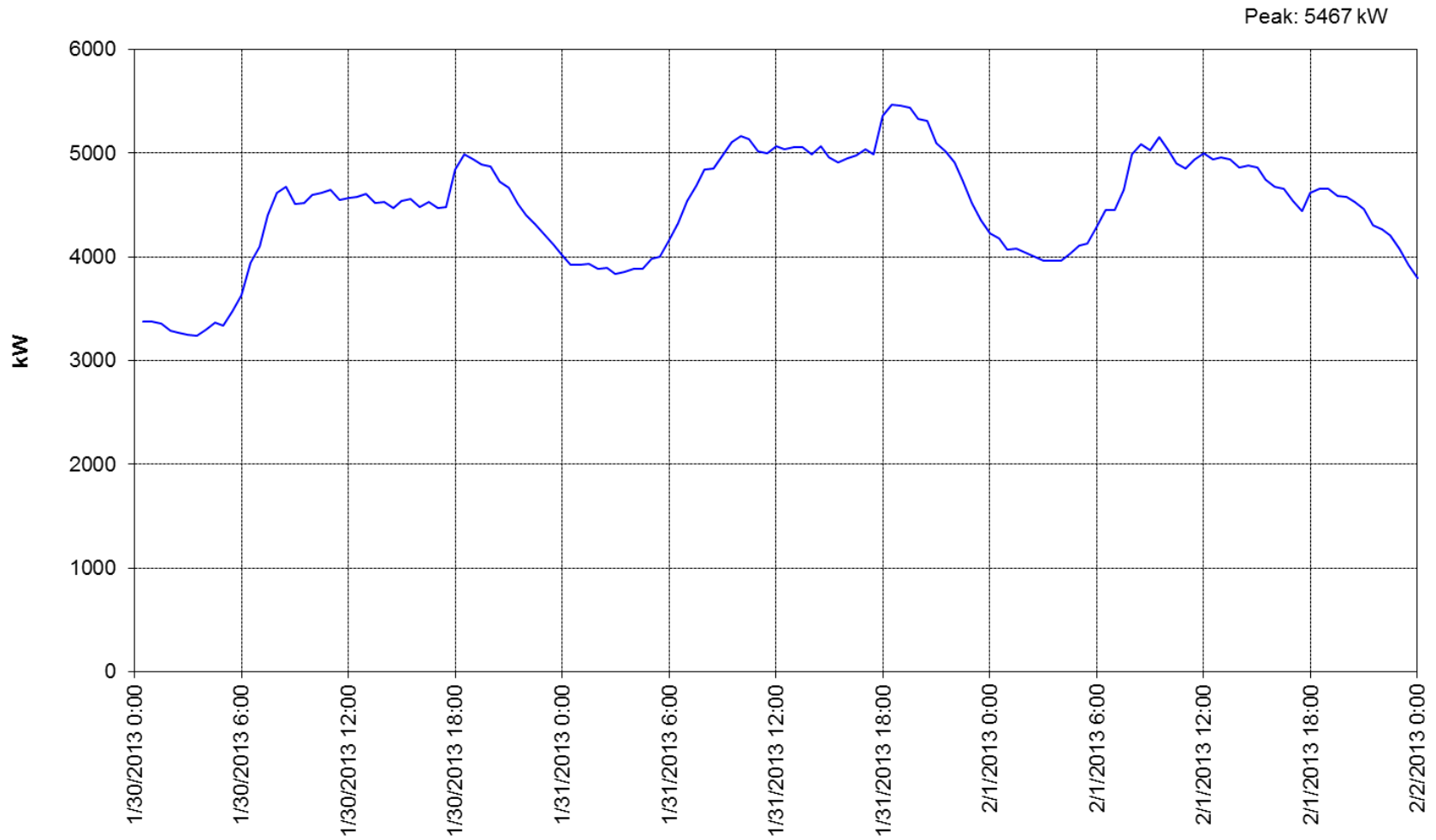
### Flandreau, SD Summer 2013 Half-Hour Load Shape - Town Gate

Peak - 6502 kW



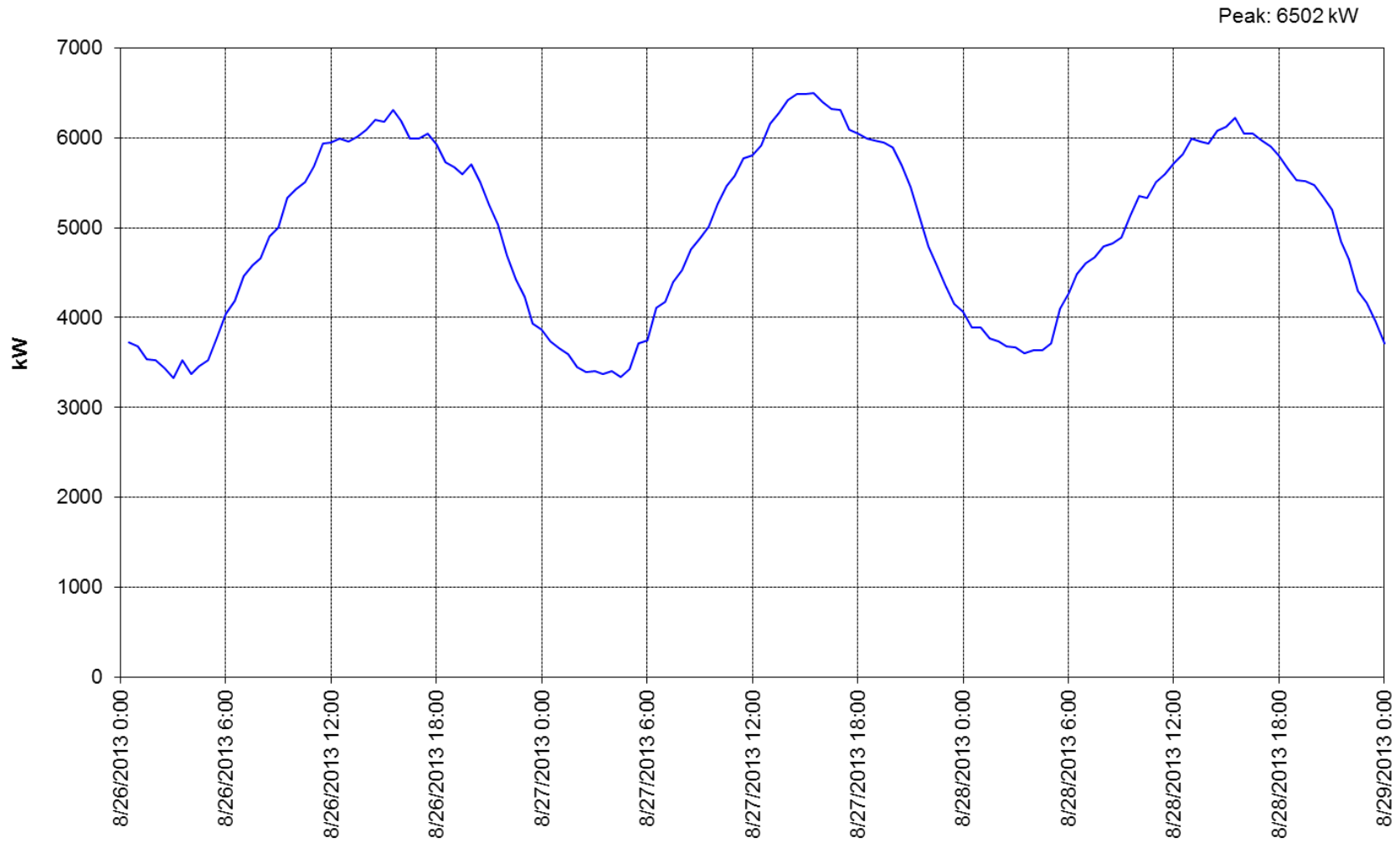
## Exhibit 7

Flandreau, SD Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate



## Exhibit 8

Flandreau, SD Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Flandreau is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Flandreau to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Flandreau has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2009	Lighting	City		\$ -	200.0	219,000
	Other	City	1	\$ -	85.0	407,000
<b>2009 Total</b>			<b>1</b>	<b>\$ -</b>	<b>285.0</b>	<b>626,000</b>
2010	Energy Star Appliance	BES	8	\$ 350	0.1	1,425
	Lighting - New Const	BES	10	\$ 800	4.7	11,582
	Res HVAC	BES	2	\$ 400	0.6	2,381
<b>2010 Total</b>			<b>20</b>	<b>\$ 1,550</b>	<b>5.4</b>	<b>15,388</b>
2011	Energy Star Appliance	BES	22	\$ 1,015	0.8	6,579
	Lighting - Retrofit	BES	61	\$ 3,515	9.4	23,850
	Res HVAC	BES	2	\$ 450	0.5	3,230
<b>2011 Total</b>			<b>85</b>	<b>\$ 4,980</b>	<b>10.7</b>	<b>33,659</b>
2012	CI HVAC	BES	8	\$ 4,755	23.0	38,112
	Comm Refrigeration Audit	BES	2	\$ -	0.1	2,291
	Custom Electric Program	BES	1	\$ 60	0.2	468
	Energy Star Appliance	BES	18	\$ 700	0.5	4,378
	Lighting - New Const	BES	41	\$ 1,025	2.5	10,787
	Lighting - Retrofit	BES	120	\$ 1,700	3.9	27,940
	Res HVAC	BES	9	\$ 925	2.7	3,259
	VFDs and Pumps	BES	2	\$ 400	2.6	7,137
	Comm Refrigeration	BES	13	\$ 390	1.1	10,992
<b>2012 Total</b>			<b>214</b>	<b>\$ 9,955</b>	<b>36.5</b>	<b>105,364</b>
2013	CI HVAC	BES	3	\$ 290	1.1	1,702
	Custom Electric Program	BES	1	\$ 2,694	11.5	21,260
	Energy Star Appliance	BES	10	\$ 500	0.3	2,954
	Lighting - New Const	BES	104	\$ 5,161	17.1	76,627
	Lighting - Retrofit	BES	273	\$ 2,017	12.3	38,874
	Res HVAC	BES	14	\$ 1,900	3.6	7,398
	Specialty Measures	BES	1	\$ 50	0.0	100
<b>2013 Total</b>			<b>406</b>	<b>\$ 12,612</b>	<b>45.9</b>	<b>148,915</b>
<b>Grand Total</b>			<b>726</b>	<b>\$ 29,097</b>	<b>383.5</b>	<b>929,326</b>

## ***D. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Flandreau was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

## ***E. Options Chosen – Development of Action Plan***

DSM software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or are planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

### ***i. Future Actions***

It is assumed that Flandreau will continue to participate in the Bright Energy Solutions program. Flandreau would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Flandreau will participate in all of the Bright Energy Solutions programs to the extent possible, with the exception of appliance turn-in measures, where Flandreau Utility personnel has identified that participation levels might be reduced due to the lack of market potential. This assumption was made only to obtain more realistic expectations for the five-year plan, and is certainly not considered to be a cap on participation in the event that the program attracts more participants than anticipated.

Representatives from Flandreau plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, it is unknown if Flandreau will participate in the MRES Coordinated Demand Response (CDR) program in the future. That decision will be evaluated in years to come.

### ***ii. Milestones***

As part of the annual WAPA IRP updates, Flandreau will evaluate the progress on these programs. The success will be measured against this 5-year plan, with

adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

#### ***F. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

#### ***G. Public Participation***

A preliminary draft of this report was produced on June 25, 2014. A notice of public hearing on IRP was published in the local newspaper on July 9, 2014. The public hearing on the IRP was held at the July 21, 2014 City Council meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The City Council approved the resolution on July 21, 2014. A copy of the approved resolution is included in Appendix 2.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b>6/25/2014</b>
Date Published in Paper	<b>7/9/2014</b>
Public Hearing Date	<b>7/21/2014</b>
Date Approved by City Council	<b>7/21/2014</b>



## Appendix 1 – Detailed DSM Measures Installed

Utility Flandreau

			BES or City				
Year	Program	Measure	City	Quan	Incentive	kW	kWh
2009	Lighting	Street Lights	City	(blank)	\$ -	200.0	219,000
					\$ -	200.0	219,000
	Other	Distribution Center Upgrade	City	1	\$ -	85.0	407,000
					\$ -	85.0	407,000
2009 Total					\$ -	285.0	626,000
2010	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 100	0.0	450
				2	\$ 200	0.1	701
		Energy Star Dishwasher	BES	1	\$ 50	0.0	274
				\$ 350	0.1	1,425	
	Lighting - New Const	Ltng New Const _ T5HO 4ft Hi Bay Fixture	BES	10	\$ 800	4.7	11,582
					\$ 800	4.7	11,582
	Res HVAC	HVAC Air_Source HP	BES	1	\$ 250	0.4	1,981
				HVAC HE Furnace with ECM	BES	1	\$ 150
		\$ 400	0.6			2,381	
		2010 Total					\$ 1,550
2011	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 200	0.1	900
				2	\$ 200	0.1	900
		Energy Star Dishwasher	BES	1	\$ 50	0.0	274
				Energy Star Refrigerators	BES	1	\$ 350
		2	\$ 200			0.2	1,620
		Energy Star Room AC	BES	1	\$ 15	0.1	50
	\$ 1,015			0.8	6,579		
	Lighting - Retrofit	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	38	\$ 3,230	8.5	20,267
		Ltng Retro _Flrscnt T8 & T5 w/Elec Bal	BES	23	\$ 285	0.9	3,583
		\$ 3,515	9.4	23,850			
	Res HVAC	HVAC HE Furnace with ECM	BES	1	\$ 150	0.2	400
				HVAC HP Water Heater	BES	1	\$ 300
		\$ 450	0.5			3,230	
2011 Total					\$ 4,980	10.7	33,659
2012	CI HVAC	Split System Air Source HP	BES	1	\$ 480	1.7	4,833
		Unitary Air Cooled Split System AC	BES	3	\$ 1,125	5.6	8,772
		Unitary Single Pkgd AC	BES	4	\$ 3,150	15.7	24,507
		\$ 4,755	23.0	38,112			
	Comm Refrigeration Audit	Coil Cleaning kit	BES	1	\$ -	0.0	1,880
		LED Screw-in Replacement Lamp	BES	1	\$ -	0.0	411
		\$ -	0.1	2,291			
	Custom Electric Program	Custom	BES	1	\$ 60	0.2	468
					\$ 60	0.2	468
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 150	0.1	675

				2	\$	100	0.0	450
	Energy Star Dehumidifier	BES		1	\$	10	0.0	88
	Energy Star Dishwasher	BES		1	\$	75	0.0	411
				2	\$	50	0.0	274
	Energy Star Refrigerators	BES		1	\$	50	0.0	405
				5	\$	250	0.2	2,025
	Energy Star Room AC	BES		1	\$	15	0.1	50
					\$	700	0.5	4,378
Lighting - New Const	Ltng NC _ LED Recessed Downlight	BES		41	\$	1,025	2.5	10,787
					\$	1,025	2.5	10,787
Lighting - Retrofit	Ltng Retro _ Flrsct T8 & T5 w/Elec Bal	BES		50	\$	650	1.7	6,100
	Ltng Retro _ LED & Induction Tech	BES		70	\$	1,050	2.3	21,840
					\$	1,700	3.9	27,940
Res HVAC	HVAC Central AC unit	BES		1	\$	100	1.3	698
	HVAC HE Furnace with ECM	BES		1	\$	300	0.5	800
				3	\$	450	0.7	1,200
	Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	BES		3	\$	75	0.3	561
					\$	925	2.7	3,259
VFDs and Pumps	Variable Freq Drives	BES		2	\$	400	2.6	7,137
					\$	400	2.6	7,137
Comm Refrigeration	ECM Fan Motor for Cooler-Freezer	BES		6	\$	120	0.3	3,954
	LED Reach-in Refrigerated Case Ltg	BES		1	\$	120	0.2	2,466
	Low Heat Reach-in Freezer Door	BES		6	\$	150	0.5	4,572
					\$	390	1.1	10,992
<b>2012 Total</b>					\$	9,955	36.5	105,364
2013	CI HVAC	ECM in Res Style Furnace	BES	1	\$	150	0.2	400
		Energy Star Window AC	BES	2	\$	140	0.8	1,302
					\$	290	1.1	1,702
	Custom Electric Program	Custom Lighting	BES	1	\$	2,694	11.5	21,260
					\$	2,694	11.5	21,260
Energy Star Appliance	Energy Star Clothes Washer	BES		1	\$	200	0.1	524
	Energy Star Refrigerators	BES		1	\$	300	0.3	2,430
					\$	500	0.3	2,954
Lighting - New Const	CEE Qual T8 4ft Low Wattage System	BES		19	\$	171	0.5	1,811
	T5HO 4ft Hi Bay Fixture	BES		37	\$	2,590	9.4	57,758
	T8 4ft Hi Bay Fixture	BES		18	\$	900	2.7	6,397
				30	\$	1,500	4.5	10,661
					\$	5,161	17.1	76,627
Lighting - Retrofit	Hi Performance T8 4ft CEE Qual	BES		7	\$	49	0.2	425
	LED & Induction Tech	BES		42	\$	630	2.4	4,694
	Rducd Wtg T8 Lamps ONLY	BES		78	\$	78	0.3	671
	T8 2ft w/Elec Bal	BES		5	\$	30	0.1	120
	T8 4ft w/Elec Bal	BES		10	\$	130	0.4	809
	CFL Fixtures and Lamps	BES		120	\$	180	5.8	25,957
	T8 Hi Bay Fixtures w/ 4ft Lamps	BES		11	\$	920	3.1	6,198
					\$	2,017	12.3	38,874
Res HVAC	Air Handler _ Fan Coil with ECM	BES		1	\$	150	0.2	400
	HVAC Air_Source HP - 14.5 SEER	BES		1	\$	250	0.2	1,581
	HVAC Central AC unit	BES		1	\$	100	0.9	516

	HVAC HE Furnace with ECM	BES	1	\$	750	1.2	2,000
			2	\$	600	0.9	1,600
	Programmable Thermostat - Heat Pump	BES	1	\$	25	0.1	1,114
	Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	BES	1	\$	25	0.1	187
				\$	<b>1,900</b>	<b>3.6</b>	<b>7,398</b>
Specialty Measures	Energy Star Clothes Washer - Elec WH	BES	1	\$	50	0.0	100
				\$	<b>50</b>	<b>0.0</b>	<b>100</b>
<b>2013 Total</b>				\$	<b>12,612</b>	<b>45.9</b>	<b>148,915</b>
<b>Grand Total</b>				\$	<b>29,097</b>	<b>383.5</b>	<b>929,326</b>

## Appendix 2 – Flandreau Resolution

### RESOLUTION NO. 2014-11

#### A RESOLUTION TO APPROVE AN INTEGRATED RESOURCE PLAN SUMMARY REPORT

WHEREAS, the City of Flandreau purchases a significant portion of its power supply from the Western Area Power Administration (Western); and

WHEREAS, Western has recently published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing of an Integrated Resource Plan (IRP); and

WHEREAS, the municipal utility staff has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and

WHEREAS, our customers were informed of our IRP and resulting Action Plans through various means including a Public Hearing where public questions and comments were encouraged; and

WHEREAS, any public comments received will be addressed in order to strengthen the City's Integrated Resource Plan.


NOW THEREFORE BE IT RESOLVED by the City of Flandreau City Council as follows:

That the "Integrated Resource Plan Summary Report for the City of Flandreau dated July 2014 shall be approved for filing with Western under the Energy Planning and Management Program."

Passed and approved this 21st day of July, 2014.

  
\_\_\_\_\_  
Mark R. Bonrud  
Mayor

ATTEST:

  
\_\_\_\_\_  
Donald W. Whitman  
City Administrator

Adopted: July 21<sup>st</sup>, 2014  
Published: July 30<sup>th</sup>, 2014  
Effective: August 19<sup>th</sup>, 2014

## **Fort Pierre, SD Resource Planning**

### ***H.* City Information**

Fort Pierre, located in Moody County, is a community of more than 2,000 individuals located in central South Dakota. The residential sector includes 959 housing units. The median age of the population is 41.8 years. About 16% of the population is 65 years of age or older and about 24.1% percent are under 18 years old. In 2012, the municipal utility had 990 residential customers and 264 commercial customers. The residential sector's yearly usage averaged 12,199 kWh per customer in 2012, and commercial customers averaged 51,485 kWh.

The rates for each type of customer are shown on in the Exhibit 1. As of January 2014, the residential sector was charged 8.18 cents per kWh, and received a fixed customer charge of \$9.00. Small commercial customers were charged 8.7 cents per kWh, and received a fixed customer charge of \$15 or \$20. Large commercial customers were charged 4.8 cents per kWh and received a fixed service charge of \$28. Additionally, large commercial customers also paid a demand charge of \$11.98 per kW.

Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4 show the winter and summer peak demand and energy for 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Fort Pierre on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 5,372 kW in the winter and 5,659 kW in the summer. Exhibits 7 and 8 each show the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load remaining flat from midnight to 6 am then increasing till roughly 9 am. Then loads begin to decline until 4 pm. Loads then fall again until 6 am the next day. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline occurs until 6 am the next day.

## Exhibit 1

### FORT PIERRE, SOUTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$9.00
	\$/kWh	\$.0818
Small Commercial - Single Phase	Customer Charge	\$15.00
	\$/kWh	\$.087
Small Commercial - Three Phase	Customer Charge	\$20.00
	\$/kWh	\$.087
Large Commercial	Customer Charge	\$28.00
	\$/kWh	\$.048
	\$/kW	\$11.98

## Exhibit 2

MRES Seasonal Load Report  
Fort Pierre, SD  
Town Gate Load  
BASE Forecast

1/31/14 2:14 PM

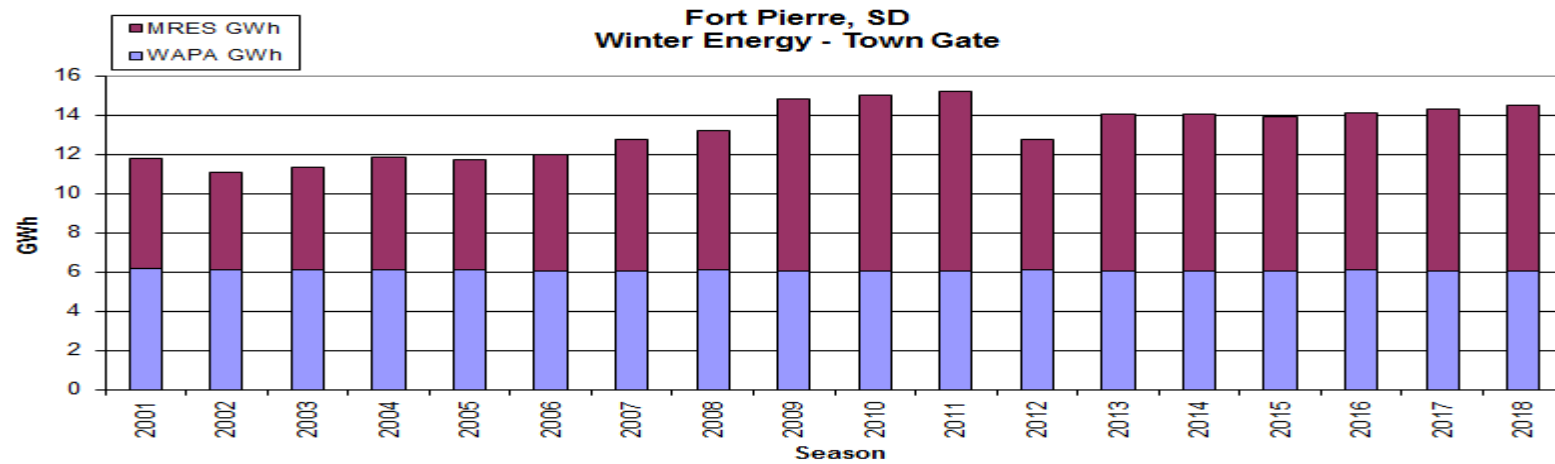
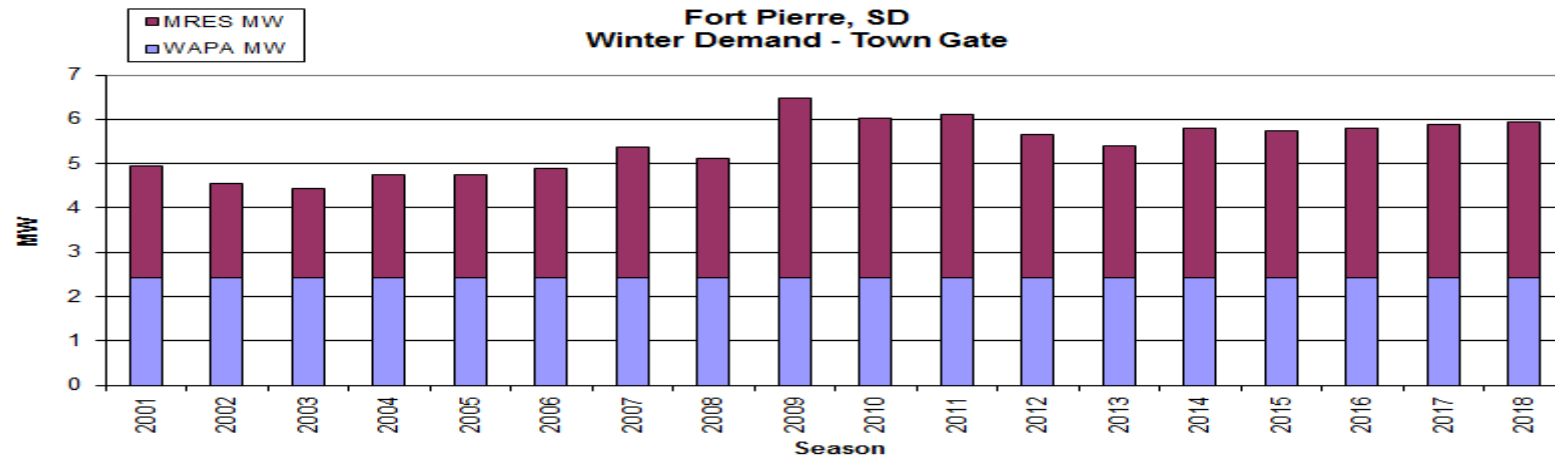
Town Gate Load

Monthly Splits

Historic Through 12/2013

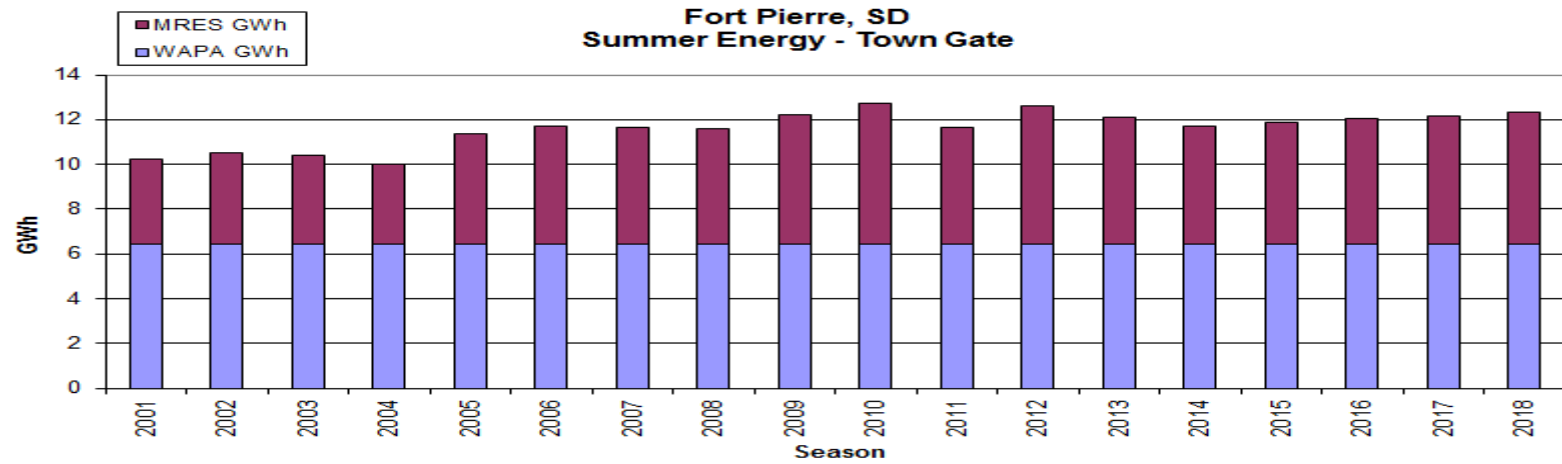
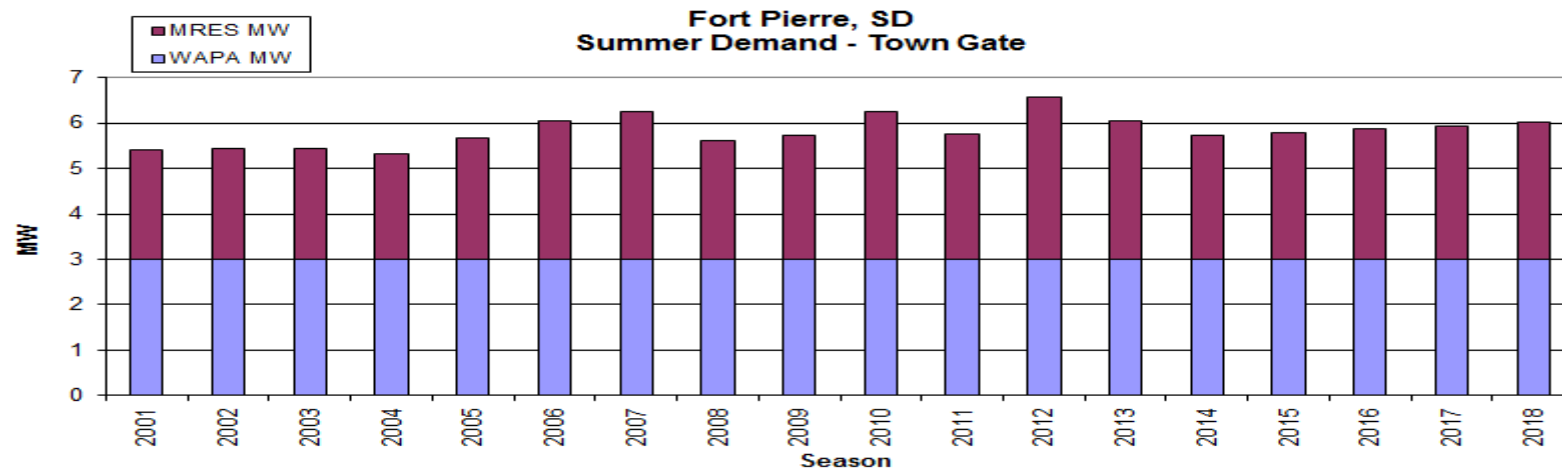
Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	5,003	3,010	2,399	0	2001	10,238,724	6,426,000	3,812,724	0
2002	4,942	3,010	2,414	0	2002	10,526,364	6,426,000	4,100,364	0
2003	4,966	3,010	2,427	0	2003	10,389,492	6,426,000	3,963,492	0
2004	4,841	3,010	2,313	0	2004	10,001,870	6,426,000	3,575,870	0
2005	5,342	3,010	2,652	0	2005	11,367,699	6,426,000	4,941,699	0
2006	5,558	3,005	3,034	0	2006	11,715,639	6,414,000	5,301,639	0
2007	5,754	3,005	3,230	0	2007	11,664,740	6,414,000	5,250,740	0
2008	5,139	3,005	2,615	0	2008	11,580,280	6,414,000	5,166,280	0
2009	5,253	3,005	2,714	0	2009	12,201,273	6,414,000	5,787,273	0
2010	5,772	3,005	3,248	0	2010	12,707,522	6,414,000	6,293,522	0
2011	5,471	3,005	2,759	0	2011	11,645,213	6,414,000	5,231,213	0
2012	6,102	3,005	3,578	0	2012	12,593,757	6,414,000	6,179,757	0
2013	5,659	3,005	3,051	0	2013	12,127,469	6,414,000	5,713,469	0
2014	5,235	3,005	2,711	0	2014	11,688,288	6,414,000	5,274,288	0
2015	5,308	3,005	2,784	0	2015	11,852,431	6,414,000	5,438,431	0
2016	5,382	3,005	2,858	0	2016	12,016,603	6,414,000	5,602,603	0
2017	5,455	3,005	2,931	0	2017	12,180,806	6,414,000	5,766,806	0
2018	5,529	3,005	3,005	0	2018	12,345,040	6,414,000	5,931,040	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	4,221	2,433	2,102	0	2002	11,091,060	6,065,000	5,026,060	0
2003	4,309	2,433	2,002	0	2003	11,345,292	6,065,000	5,280,292	0
2004	4,689	2,433	2,311	0	2004	11,843,350	6,104,000	5,739,350	0
2005	4,633	2,433	2,312	0	2005	11,685,679	6,065,000	5,620,679	0
2006	4,527	2,428	2,471	0	2006	11,936,475	6,056,000	5,880,475	0
2007	5,139	2,428	2,943	0	2007	12,744,913	6,052,000	6,692,913	0
2008	5,108	2,428	2,680	0	2008	13,217,031	6,091,000	7,126,031	0
2009	6,087	2,428	4,035	0	2009	14,813,307	6,052,000	8,761,307	0
2010	5,834	2,428	3,596	0	2010	14,987,302	6,052,000	8,935,302	0
2011	5,778	2,428	3,681	0	2011	15,161,911	6,052,000	9,109,911	0
2012	5,288	2,428	3,236	0	2012	12,763,022	6,091,000	6,672,022	0
2013	5,372	2,428	2,964	0	2013	14,046,340	6,052,000	7,994,340	0
2014	5,408	2,428	3,356	0	2014	14,038,194	6,052,000	7,986,194	0
2015	5,413	2,428	3,298	0	2015	13,934,077	6,052,000	7,882,077	0
2016	5,488	2,428	3,373	0	2016	14,128,020	6,091,214	8,036,806	0
2017	5,563	2,428	3,448	0	2017	14,321,997	6,052,000	8,269,997	0
2018	5,638	2,428	3,523	0	2018	14,516,012	6,052,000	8,464,012	0

### Exhibit 3



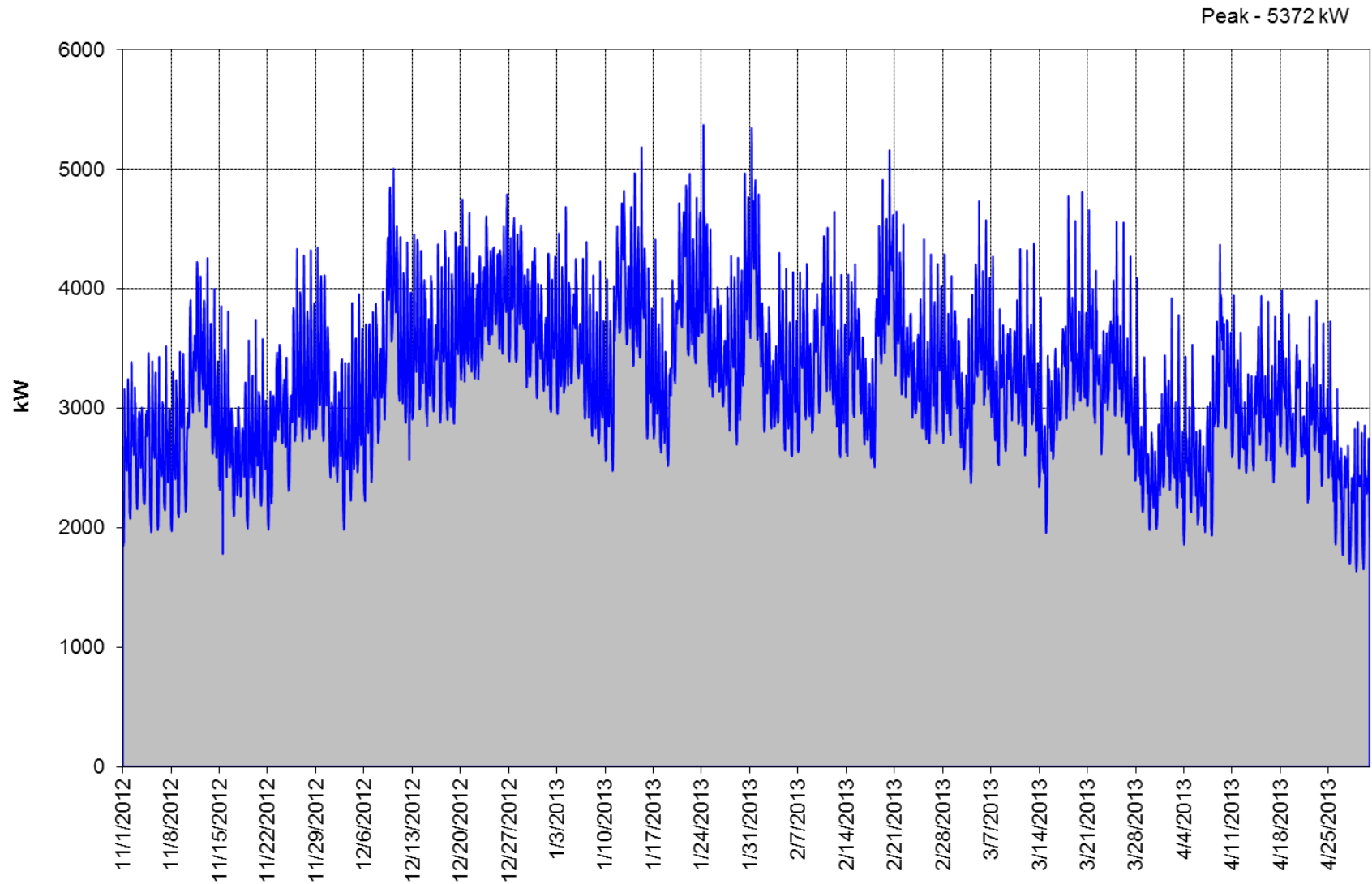


## Exhibit 4



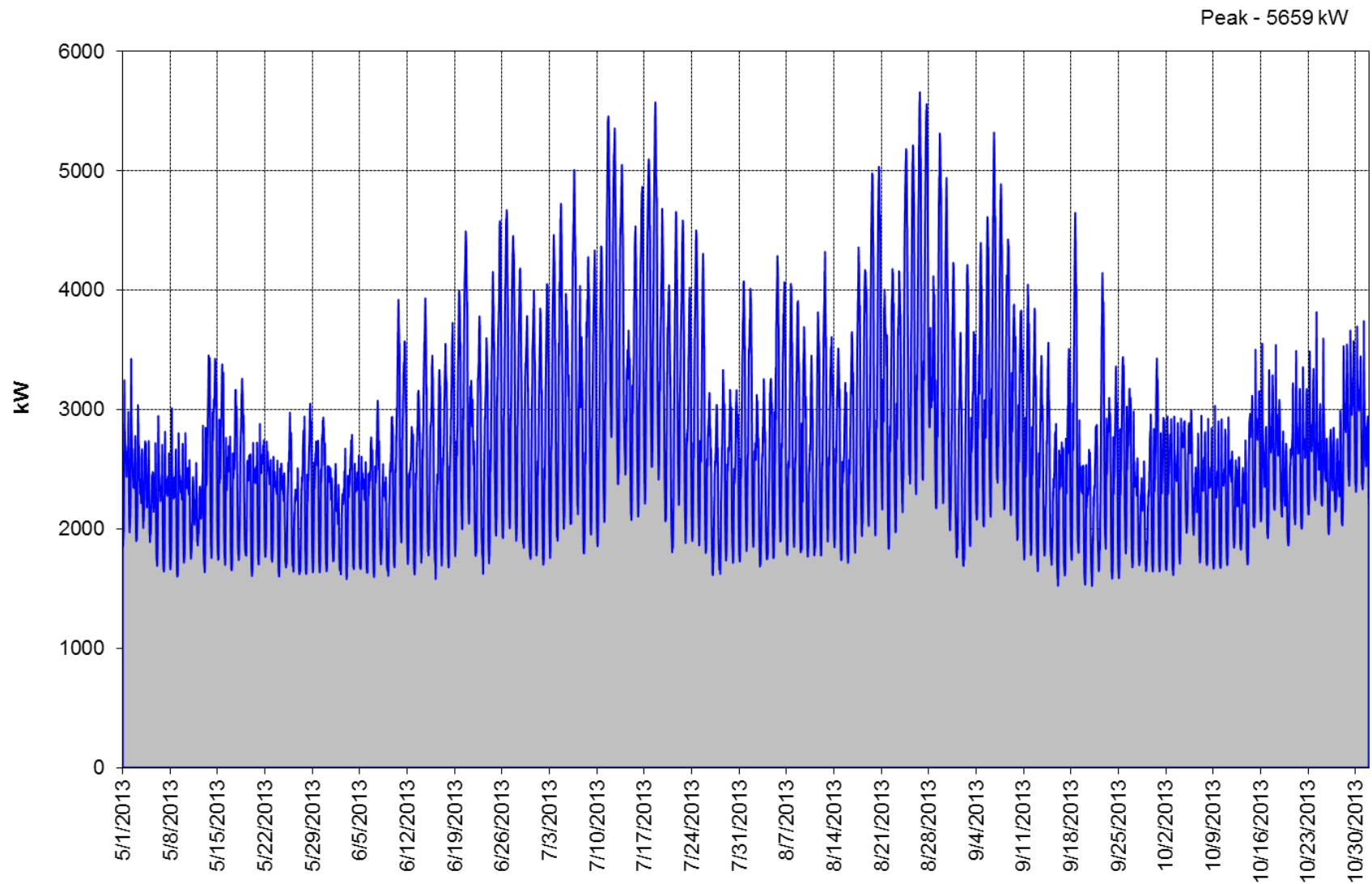
## Exhibit 5

### Fort Pierre, SD Winter 2012-2013 Half-Hour Load Shape - Town Gate



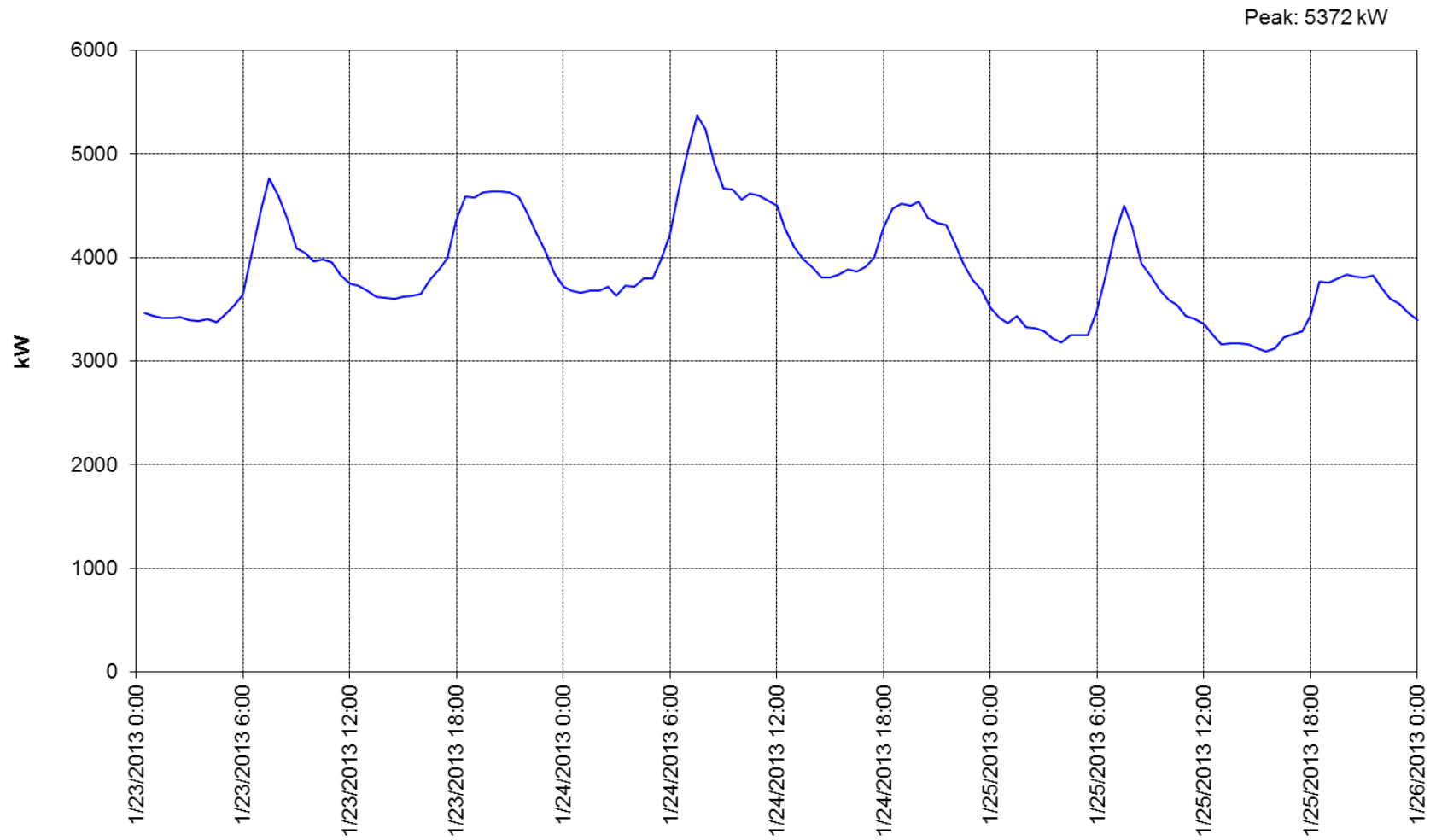
## Exhibit 6

### Fort Pierre, SD Summer 2013 Half-Hour Load Shape - Town Gate



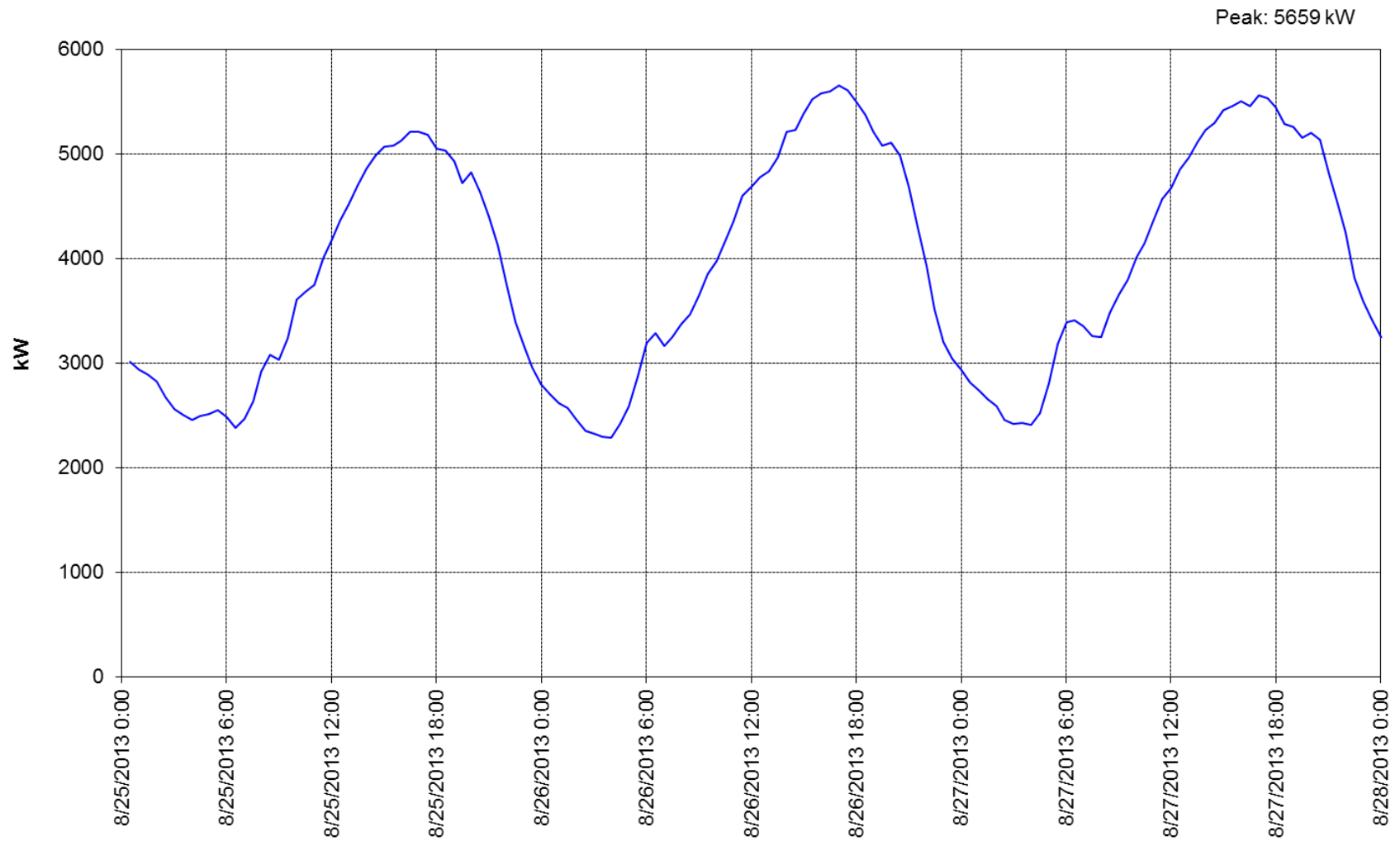
## Exhibit 7

### Fort Pierre, SD Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate



## Exhibit 8

Fort Pierre, SD Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***I. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Fort Pierre is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Fort Pierre to individually study supply-side resources as part of this IRP.

## ***J. Historic DSM Efforts***

Fort Pierre has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2009	Energy Star Appliance	BES	1	\$ 300	0.1	1,290
	Lighting	BES	60	\$ 3,816	12.0	52,548
	Res HVAC	BES		\$ 800	1.3	4,762
<b>2009 Total</b>			<b>61</b>	<b>\$ 4,916</b>	<b>13.4</b>	<b>58,600</b>
2010	Custom Electric Program	BES	1	\$ 240	0.9	3,826
	Energy Star Appliance	BES	28	\$ 996	0.3	3,765
	Lighting - New Const	BES	16	\$ 690	3.5	8,419
	Lighting - Retrofit	BES	362	\$ 13,593	36.5	87,768
	Res HVAC	BES	13	\$ 2,200	3.8	20,290
<b>2010 Total</b>			<b>420</b>	<b>\$ 17,719</b>	<b>45.0</b>	<b>124,068</b>
2011	CI HVAC	BES	1	\$ 150	0.2	400
	Energy Star Appliance	BES	44	\$ 969	0.5	5,611
	Lighting - New Const	BES	9	\$ 670	3.7	13,300
	Lighting - Retrofit	BES	744	\$ 3,297	24.1	92,392
	Res HVAC	BES	16	\$ 2,075	3.1	12,859
<b>2011 Total</b>			<b>814</b>	<b>\$ 7,161</b>	<b>31.6</b>	<b>124,562</b>
2012	Custom Electric Program	BES	1	\$ 135	0.5	1,172
	Energy Star Appliance	BES	5	\$ 225	0.1	1,217
	Lighting - Retrofit	BES	258	\$ 3,828	13.5	62,689
	Res HVAC	BES	18	\$ 2,075	5.1	10,485
<b>2012 Total</b>			<b>282</b>	<b>\$ 6,263</b>	<b>19.2</b>	<b>75,563</b>
2013	CI HVAC	BES	8	\$ 850	1.0	9,189
	Energy Star Appliance	BES	20	\$ 900	0.5	3,158
	Lighting - New Const	BES	102	\$ 2,550	6.7	24,609
	Lighting - Retrofit	BES	295	\$ 5,195	17.7	48,640
	Res HVAC	BES	12	\$ 1,500	2.7	13,206
<b>2013 Total</b>			<b>437</b>	<b>\$ 10,995</b>	<b>28.6</b>	<b>98,802</b>
<b>Grand Total</b>			<b>2014</b>	<b>\$ 47,054</b>	<b>137.7</b>	<b>481,595</b>

## ***K. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Fort Pierre was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

## ***L. Options Chosen – Development of Action Plan***

DSM software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or are planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

### ***i. Future Actions***

It is assumed that Fort Pierre will continue to participate in the Bright Energy Solutions program. Fort Pierre would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Fort Pierre will participate in all of the Bright Energy Solutions programs to the maximum extent possible. This assumption was made only to obtain a more realistic estimate for the five-year plan, and is certainly not considered to be a cap on participation in the event that the program attracts more participants than anticipated.

Representatives from Fort Pierre plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, it is unknown if Fort Pierre will participate in the MRES Coordinated Demand Response (CDR) program in the future. That decision will be evaluated in years to come.

### ***ii. Milestones***

As part of the annual WAPA IRP updates, Fort Pierre will evaluate the progress on these programs. The success will be measured against this 5-year plan, with adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.



Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

## ***M. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

## ***N. Public Participation***

A preliminary draft of this report was produced on July 3, 2014. A notice of public hearing on IRP was published in the local newspaper on June 20, 2014. The public hearing on the IRP was held at the July 7, 2014 City Council meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The City Council approved the resolution on July 7, 2014. A copy of the approved resolution is included in Appendix 2.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b><i>7/3/2014</i></b>
Date Published in Paper	<b><i>6/20/2014</i></b>
Public Hearing Date	<b><i>7/7/2014</i></b>
Date Approved by City Council	<b><i>7/7/2014</i></b>

## Appendix 1 – Detailed DSM Measures Installed

Utility Fort Pierre

			BES or City					
Year	Program	Measure		Quan	Incentive	kW	kWh	
2009	Energy Star Appliance	GE WPRE61SQKWT	BES	1	\$ 50	0.0	165	
		(blank)	BES	(blank)	\$ 250	0.1	1,125	
					\$ 300	0.1	1,290	
	Lighting	4 CFL bulbs	BES	4	\$ 6	0.0	200	
		T8 HB 3L	BES	20	\$ 2,650	7.0	30,600	
		T8 HB 4L	BES	2	\$ 1,160	0.2	1,006	
				8		0.9	4,024	
		T8 HB 6L	BES	12		1.8	7,716	
				14		2.1	9,002	
					\$ 3,816	12.0	52,548	
	Res HVAC	(blank)	BES	(blank)	\$ 800	1.3	4,762	
					\$ 800	1.3	4,762	
						\$ 4,916	13.4	58,600
2009 Total								
2010	Custom Electric Program	Replaced 6 320 watt metal halide magnetic pulse start w 6 6 lamp T8 high bay	BES	1	\$ 240	0.9	3,826	
					\$ 240	0.9	3,826	
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 100	0.0	450	
				2	\$ 400	0.1	1,402	
				7	\$ 350	0.1	1,177	
		Energy Star Decorative Lights	BES	6	\$ 21	0.0	51	
		Energy Star Dishwasher	BES	1	\$ 75	0.0	411	
				2	\$ 50	0.0	274	
					\$ 996	0.3	3,765	
	Lighting - New Const	Ltng New Const _ T8 4ft Hi Bay Fixture	BES	16	\$ 690	3.5	8,419	
					\$ 690	3.5	8,419	
	Lighting - Retrofit	Ltng Retrofit _ CFL Fixtures & Lamps	BES	10	\$ 15	0.4	980	
		Ltng Retrofit _ Flrscnt T8 & T5 w/Elec Bal	BES	6	\$ 36	0.0	112	
		Ltng Retrofit _ T8 Hi Bay Fixtures w- Elec Bal	BES	13	\$ 865	2.3	5,432	
					58	\$ 4,930	12.9	30,521
					91	\$ 6,370	19.4	45,965
		Ltng Retrofit _ Rducd Wtg Flr T8 Lamps	BES	36	\$ 18	0.1	467	
			Ltng Retrofit _ Rducd Wtg T8 CEE Qual	BES	4	\$ 72	0.1	381
					144	\$ 1,287	1.4	3,910
					\$ 13,593	36.5	87,768	
	Res HVAC	Air Handler _ Fan Coil with ECM	BES	1	\$ 150	0.2	400	
		HVAC Air_Source HP	BES	1	\$ 500	0.8	3,962	
		HVAC Central AC unit	BES	1	\$ 100	0.3	188	
		HVAC HE Furnace with ECM	BES	2	\$ 600	0.9	1,600	
			3	\$ 450	0.7	1,200		
HVAC Mini Split Ductless Air Source		BES	2	\$ 400	0.9	12,940		

HP

					\$ 2,200	3.8	20,290
<b>2010 Total</b>					<b>\$ 17,719</b>	<b>45.0</b>	<b>124,068</b>
<b>2011</b>	<b>CI HVAC</b>	ECM in Res Style Furnace	<b>BES</b>	1	\$ 150	0.2	400
					<b>\$ 150</b>	<b>0.2</b>	<b>400</b>
	<b>Energy Star Appliance</b>	Energy Star Clothes Washer	<b>BES</b>	1	\$ 250	0.1	1,125
				2	\$ 100	0.0	450
				4	\$ 200	0.1	900
		Energy Star Decorative Lights	<b>BES</b>	24	\$ 84	0.0	612
		Energy Star Dehumidifier	<b>BES</b>	1	\$ 10	0.0	88
		Energy Star Dishwasher	<b>BES</b>	1	\$ 75	0.0	411
		Energy Star Refrigerators	<b>BES</b>	1	\$ 150	0.1	1,215
				2	\$ 100	0.1	810
					<b>\$ 969</b>	<b>0.5</b>	<b>5,611</b>
	<b>Lighting - New Const</b>	Ltng NC _ T8 4ft Hi Bay Fixture	<b>BES</b>	1	\$ 270	0.0	247
				8	\$ 400	3.7	13,053
					<b>\$ 670</b>	<b>3.7</b>	<b>13,300</b>
	<b>Lighting - Retrofit</b>	Ltng Retro _ CFL Fixtures & Lamps	<b>BES</b>	405	\$ 608	11.8	52,135
		Ltng Retro _ Rducd Wtg Flr T8 Lamps	<b>BES</b>	130	\$ 65	0.6	1,505
		Ltng Retro _ Rducd Wtg T8 CEE Qual	<b>BES</b>	60	\$ 1,062	4.2	11,443
		Ltng Retro _ Flrscnt T8 & T5 w/Elec Bal	<b>BES</b>	65	\$ 1,226	4.1	13,478
		Ltng Retro _CFL Reflector Flood	<b>BES</b>	84	\$ 336	3.4	13,831
					<b>\$ 3,297</b>	<b>24.1</b>	<b>92,392</b>
	<b>Res HVAC</b>	Air Handler _ Fan Coil with ECM	<b>BES</b>	1	\$ 450	0.7	1,200
		HVAC Air _Source HP	<b>BES</b>	1	\$ 750	1.2	5,943
		HVAC HE Furnace with ECM	<b>BES</b>	1	\$ 450	0.7	1,200
				2	\$ 300	0.5	800
		Programmable Thermostat - Heat Pump	<b>BES</b>	1	\$ 75	0.0	3,342
		Programmable Thermostat - NON Elec-Gas w/AC	<b>BES</b>	1	\$ 50	0.0	374
					<b>\$ 2,075</b>	<b>3.1</b>	<b>12,859</b>
<b>2011 Total</b>					<b>\$ 7,161</b>	<b>31.6</b>	<b>124,562</b>
<b>2012</b>	<b>Custom Electric Program</b>	11 fixtures retrofited from 4 lamp F32T8 to 2 lamp F28T8.	<b>BES</b>	1	\$ 135	0.5	1,172
					<b>\$ 135</b>	<b>0.5</b>	<b>1,172</b>
	<b>Energy Star Appliance</b>	Energy Star Clothes Washer	<b>BES</b>	1	\$ 50	0.0	225
				2	\$ 100	0.0	450
		Energy Star Dishwasher	<b>BES</b>	1	\$ 25	0.0	137
		Energy Star Refrigerators	<b>BES</b>	1	\$ 50	0.0	405
					<b>\$ 225</b>	<b>0.1</b>	<b>1,217</b>
	<b>Lighting - Retrofit</b>	Ltng Retro _ Flrscnt T8 & T5 w/Elec Bal	<b>BES</b>	15	\$ 128	0.2	1,157
				40	\$ 520	1.6	4,359
				64	\$ 1,113	3.2	12,624
		Ltng Retro _ Rducd Wtg Flr T8 and T5HO Lamps	<b>BES</b>	112	\$ 56	0.4	1,397
		Ltng Retro _ Rducd Wtg T8 CEE Qual	<b>BES</b>	7	\$ 51	0.2	721
		Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	<b>BES</b>	4	\$ 340	0.7	3,174
				6	\$ 420	1.1	2,242
				10	\$ 1,200	6.0	37,015
					<b>\$ 3,828</b>	<b>13.5</b>	<b>62,689</b>

<b>Res HVAC</b>		Air Handler _ Fan Coil with ECM	<b>BES</b>	1	\$	150	0.2	400
		HVAC Air_Source HP - 14.5 SEER	<b>BES</b>	1	\$	500	0.4	3,162
		HVAC Central AC unit	<b>BES</b>	1	\$	200	0.9	545
				2	\$	200	1.8	958
		HVAC HE Furnace with ECM	<b>BES</b>	1	\$	450	0.7	1,200
				3	\$	450	0.7	1,200
		Programmable Thermostat - Elec Heat w/AC	<b>BES</b>	1	\$	25	0.1	2,272
		Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	<b>BES</b>	1	\$	50	0.1	374
				2	\$	50	0.2	374
					\$	<b>2,075</b>	<b>5.1</b>	<b>10,485</b>
<b>2012 Total</b>					\$	<b>6,263</b>	<b>19.2</b>	<b>75,563</b>
<b>2013</b>	<b>CI HVAC</b>	ECM in Res Style Air Handler _ Fan Coil	<b>BES</b>	1	\$	150	0.2	400
		ECM in Res Style Furnace	<b>BES</b>	2	\$	300	0.5	800
		Setback/Programmable Thermostats	<b>BES</b>	4	\$	200	0.0	7,644
		Unitary Air Cooled Split Sys AC <65k Btuh (1ph)	<b>BES</b>	1	\$	200	0.3	345
					\$	<b>850</b>	<b>1.0</b>	<b>9,189</b>
	<b>Energy Star Appliance</b>	Energy Star Clothes Washer	<b>BES</b>	1	\$	150	0.1	393
				2	\$	300	0.1	786
				4	\$	200	0.1	524
		Energy Star Dishwasher	<b>BES</b>	1	\$	50	0.1	120
				2	\$	50	0.1	120
		Energy Star Refrigerators	<b>BES</b>	1	\$	150	0.1	1,215
					\$	<b>900</b>	<b>0.5</b>	<b>3,158</b>
	<b>Lighting - New Const</b>	LED Energy Star Recessed Downlight	<b>BES</b>	102	\$	2,550	6.7	24,609
					\$	<b>2,550</b>	<b>6.7</b>	<b>24,609</b>
	<b>Lighting - Retrofit</b>	LED & Induction Tech	<b>BES</b>	21	\$	525	1.1	4,188
				266	\$	3,990	14.7	40,039
		T8 Hi Bay Fixtures w/ 4ft Lamps	<b>BES</b>	8	\$	680	1.8	4,413
					\$	<b>5,195</b>	<b>17.7</b>	<b>48,640</b>
	<b>Res HVAC</b>	Air Handler _ Fan Coil with ECM	<b>BES</b>	1	\$	150	0.2	400
		HVAC Air_Source HP - 14.5 SEER	<b>BES</b>	1	\$	500	0.4	3,162
		HVAC Central AC unit	<b>BES</b>	1	\$	100	0.5	299
		HVAC HE Furnace with ECM	<b>BES</b>	1	\$	150	0.2	400
				2	\$	300	0.5	800
		HVAC Mini Split_Ductless Air_Source HP	<b>BES</b>	1	\$	200	0.4	6,470
		Programmable Thermostat - AC Only	<b>BES</b>	2	\$	50	0.2	374
		Programmable Thermostat - Heat Pump	<b>BES</b>	1	\$	25	0.1	1,114
		Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	<b>BES</b>	1	\$	25	0.1	187
					\$	<b>1,500</b>	<b>2.7</b>	<b>13,206</b>
<b>2013 Total</b>					\$	<b>10,995</b>	<b>28.6</b>	<b>98,802</b>
<b>Grand Total</b>					\$	<b>47,054</b>	<b>137.7</b>	<b>481,595</b>

## Appendix 2 – Fort Pierre Resolution

### Resolution # 2014-14

#### City of Fort Pierre—Integrated Resource Plan COOP Filing

WHEREAS, the City of Fort Pierre purchases a significant portion of its power supply From Western Area Power Administration (Western); and

WHEREAS, Western has recently published its Energy Planning Management Program Rules specifying the requirement for preparing and filing of an Integrated Resource Plan (IRP); and

WHEREAS, the City of Fort Pierre has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and

WHEREAS, Our customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and


WHEREAS, any public comment received has been addressed in order to strengthen the city's IRP; and

WHEREAS, the IRP Summary Report included 5-year and 2-year action plans outlining actions to be taken by the Municipal Utility during the next several years,

THEREFORE BE IT RESOLVED, by the Fort Pierre City Council:

That the "Integrated Resource Plan Summary Report for the City of Fort Pierre dated July 2014 be approved for filing with Western under the Energy Planning and Management Program."

Adopted and effective this 7th day of July, 2014.



Gloria Hanson, Mayor  
City of Fort Pierre



Attest: Roxanne Heezen, Finance Officer

## **V. Hillsboro, ND Resource Planning**

### **A. *City Information***

Hillsboro, located in Traill County, is a community of more than 1,600 individuals located in eastern North Dakota. The City has one elementary school and one high school. The residential sector included 763 housing units, and the median age of the population is 40.5 years. About 18.7% of the population is 65 years of age or older and about 25.6% percent are under 18 years old. In 2011, the municipal utility had 840 residential customers, and 142 commercial customers. The residential sector's yearly usage averaged 20,645 kWh per customer in 2012, and commercial customers averaged 64,394 kWh.

The rates for each type of customer are shown on the rate sheet in the appendix. As of January 2014, the residential sector was charged 7.3 cents per kWh, plus a fixed monthly charge of \$16.00 per month. Small commercial customers were charged 6.7 cents per kWh, plus a fixed charge of \$42.00 per month. Large commercial customers were charged 6.7 cents per kWh with a fixed charge of \$42.00 per month.

Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4, which show the winter and summer peak demand and energy for 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Hillsboro on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 7,725 kW in the winter and 4,918 kW in the summer. Exhibits 7 and 8 each show the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load increasing after 5 am till roughly 9 am. Then loads begin to decline until 5am the next day. The summer peak graph indicates the load increasing from 5 am until peaking at 5 pm. Then a steady decline occurs until 5 am the next day.

## Exhibit 1

### HILLSBORO, NORTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$16.00
	\$/kWh	\$.073
Small Commercial	Customer Charge	\$42.00
	\$/kWh	\$.067
Large Commercial	Customer Charge	\$42.00
	\$/kWh	\$.067

## Exhibit 2

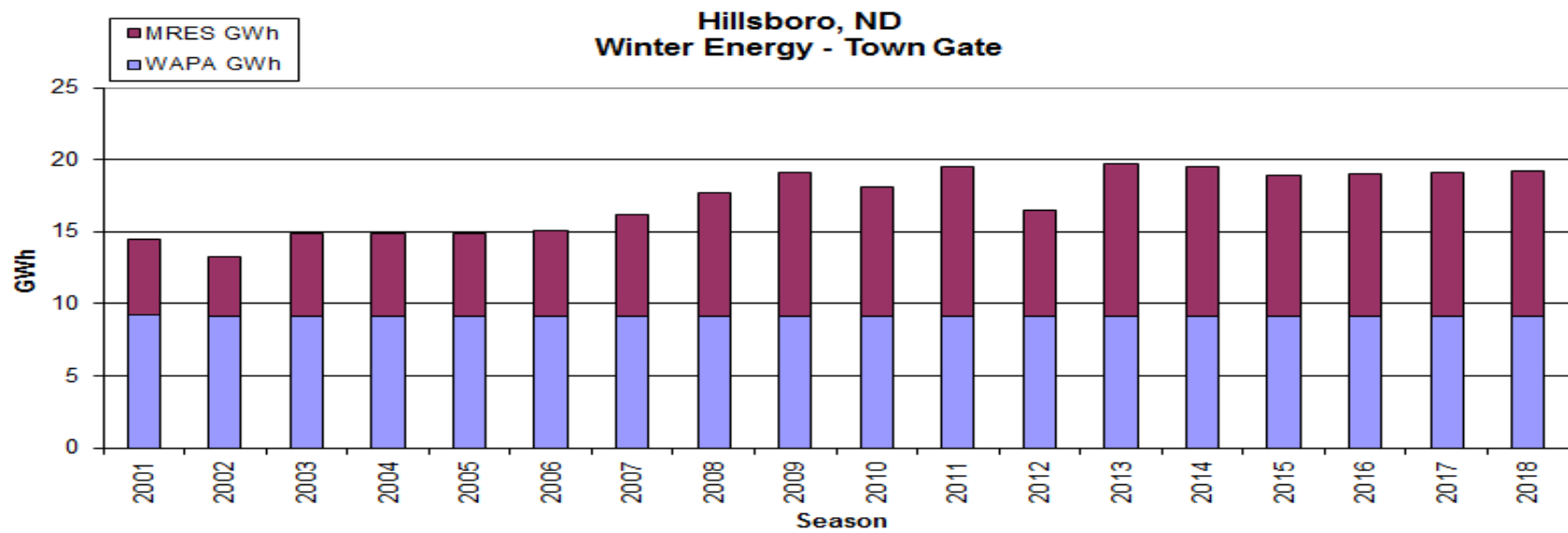
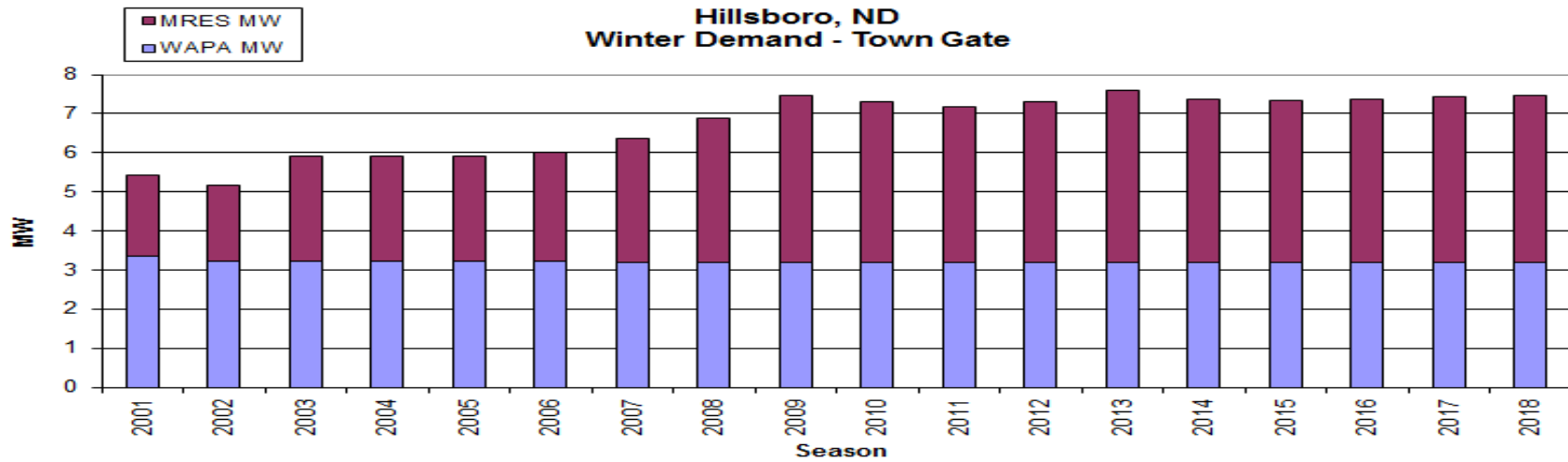
MRES Seasonal Load Report  
Hillsboro, ND  
Town Gate Load  
BASE Forecast

1/31/14 2:14 PM  
Town Gate Load  
Monthly Splits  
Historic Through 12/2013

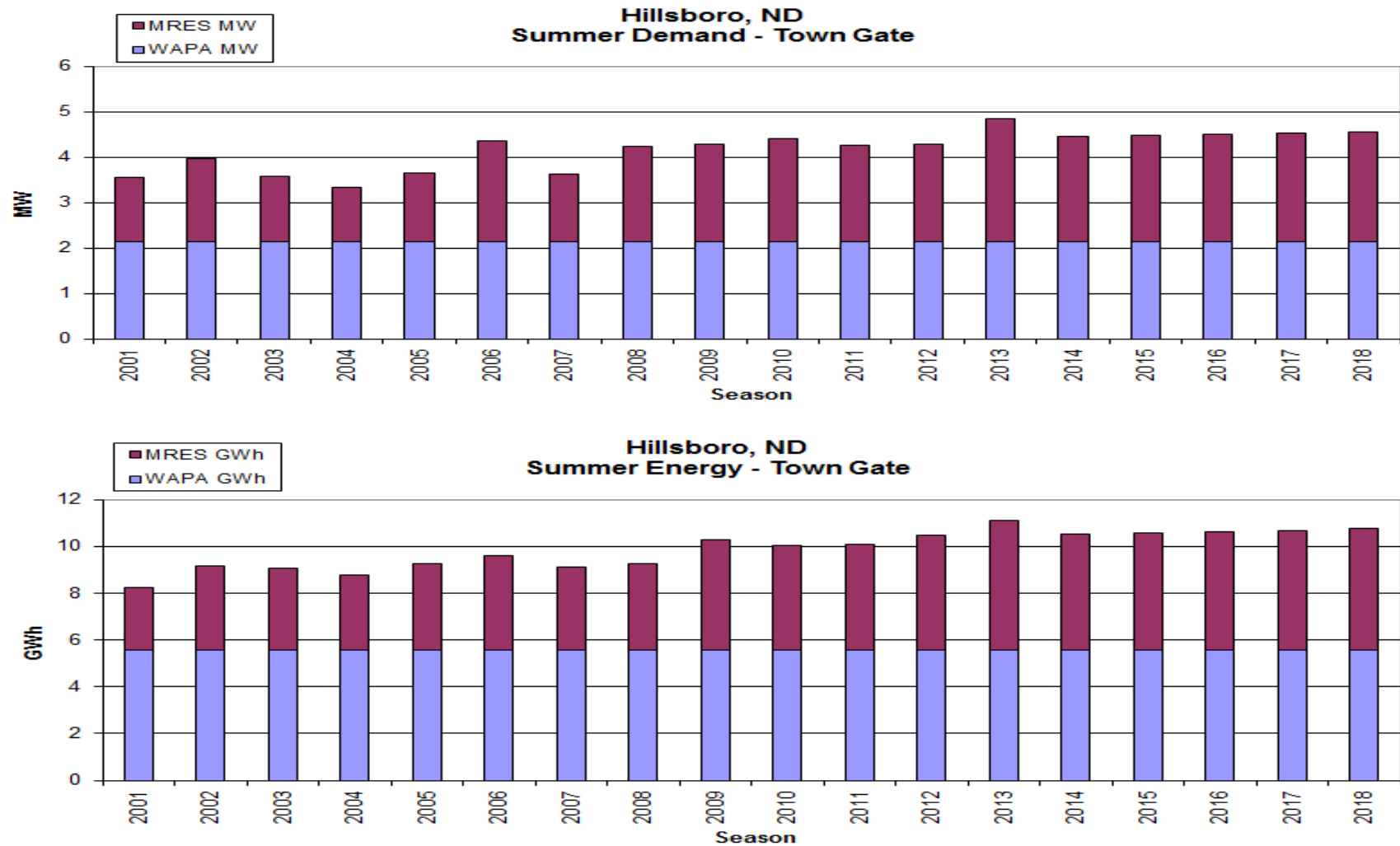
Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	3,534	2,144	1,407	0	2001	8,238,936	5,580,000	2,658,936	0
2002	3,935	2,144	1,808	0	2002	9,174,479	5,580,000	3,594,479	0
2003	3,532	2,144	1,437	0	2003	9,067,796	5,580,000	3,487,796	0
2004	3,292	2,144	1,196	0	2004	8,756,755	5,580,000	3,176,755	0
2005	3,577	2,144	1,495	0	2005	9,264,458	5,580,000	3,684,458	0
2006	4,334	2,140	2,210	0	2006	9,614,808	5,571,000	4,043,808	0
2007	3,629	2,140	1,489	0	2007	9,105,049	5,571,000	3,534,049	0
2008	4,226	2,140	2,102	0	2008	9,277,534	5,571,000	3,706,534	0
2009	4,269	2,140	2,145	0	2009	10,273,081	5,571,000	4,702,081	0
2010	4,386	2,140	2,262	0	2010	10,023,859	5,571,000	4,452,859	0
2011	4,119	2,140	2,113	0	2011	10,089,077	5,571,000	4,518,077	0
2012	4,261	2,140	2,137	0	2012	10,460,323	5,571,000	4,889,323	0
2013	4,837	2,140	2,713	0	2013	11,098,200	5,571,000	5,527,200	0
2014	4,434	2,140	2,310	0	2014	10,525,757	5,571,000	4,954,757	0
2015	4,449	2,140	2,325	0	2015	10,561,691	5,571,000	4,990,691	0
2016	4,473	2,140	2,349	0	2016	10,618,153	5,571,000	5,047,153	0
2017	4,499	2,140	2,375	0	2017	10,679,643	5,571,000	5,108,643	0
2018	4,524	2,140	2,400	0	2018	10,740,471	5,571,000	5,169,471	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	4,884	3,213	1,954	0	2002	13,262,547	9,080,829	4,181,718	0
2003	5,627	3,213	2,703	0	2003	14,863,929	9,120,000	5,743,929	0
2004	5,901	3,213	2,688	0	2004	14,885,324	9,170,000	5,715,324	0
2005	5,926	3,213	2,713	0	2005	14,878,484	9,120,000	5,758,484	0
2006	6,005	3,213	2,799	0	2006	15,047,058	9,108,000	5,939,058	0
2007	6,356	3,206	3,150	0	2007	16,198,392	9,100,000	7,098,392	0
2008	6,898	3,206	3,692	0	2008	17,722,966	9,150,000	8,572,966	0
2009	7,190	3,206	4,248	0	2009	19,152,748	9,100,000	10,052,748	0
2010	7,308	3,206	4,102	0	2010	18,072,573	9,100,000	8,972,573	0
2011	7,157	3,206	3,975	0	2011	19,531,313	9,100,000	10,431,313	0
2012	7,316	3,206	4,110	0	2012	16,458,135	9,150,000	7,308,135	0
2013	7,593	3,206	4,387	0	2013	19,678,184	9,100,000	10,578,184	0
2014	7,376	3,206	4,170	0	2014	19,541,607	9,100,000	10,441,607	0
2015	7,342	3,206	4,136	0	2015	18,934,529	9,100,000	9,834,529	0
2016	7,381	3,206	4,175	0	2016	19,023,038	9,150,250	9,872,788	0
2017	7,424	3,206	4,218	0	2017	19,130,264	9,100,000	10,030,264	0
2018	7,467	3,206	4,261	0	2018	19,239,856	9,100,000	10,139,856	0



### Exhibit 3

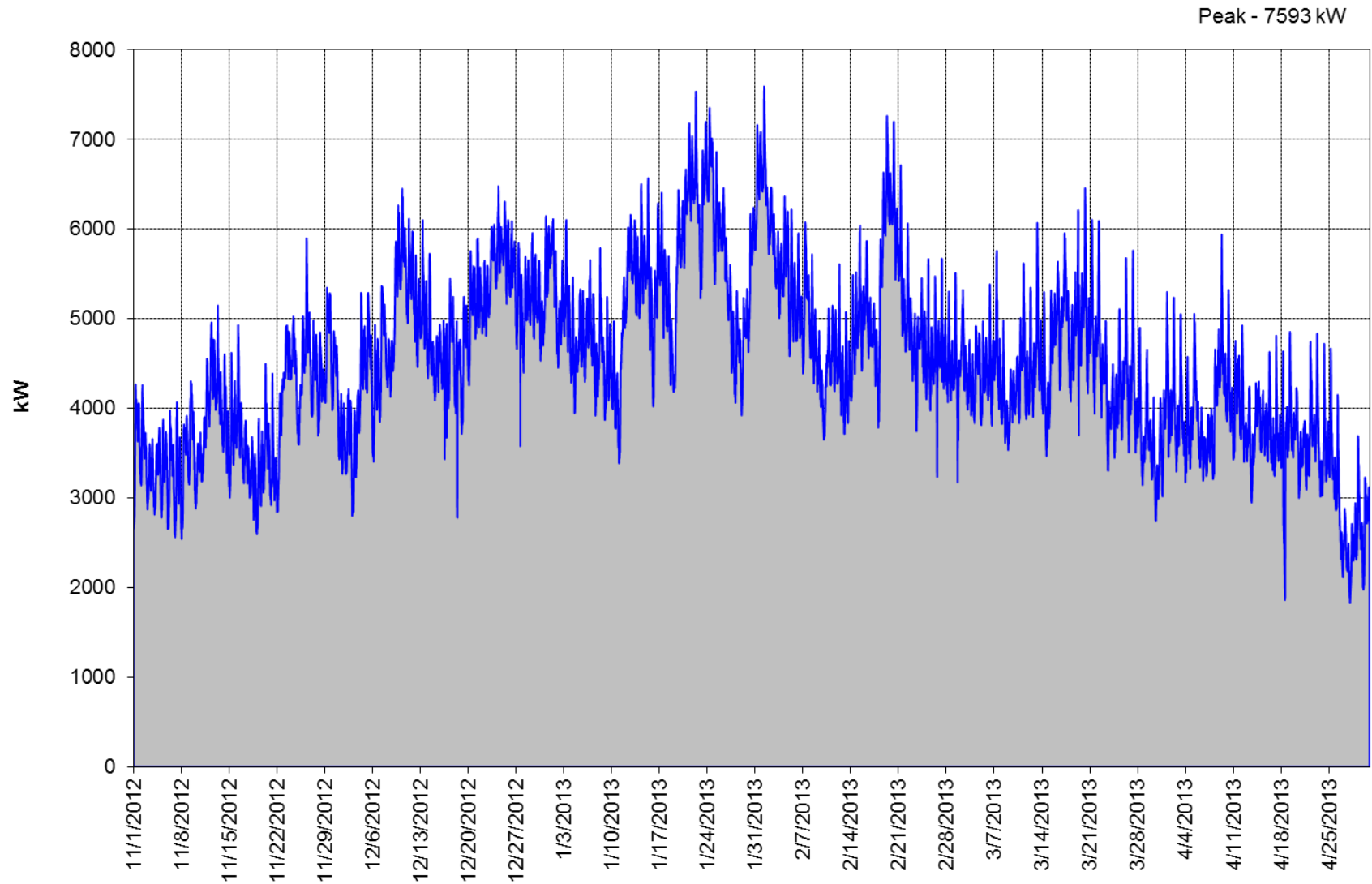


## Exhibit 4



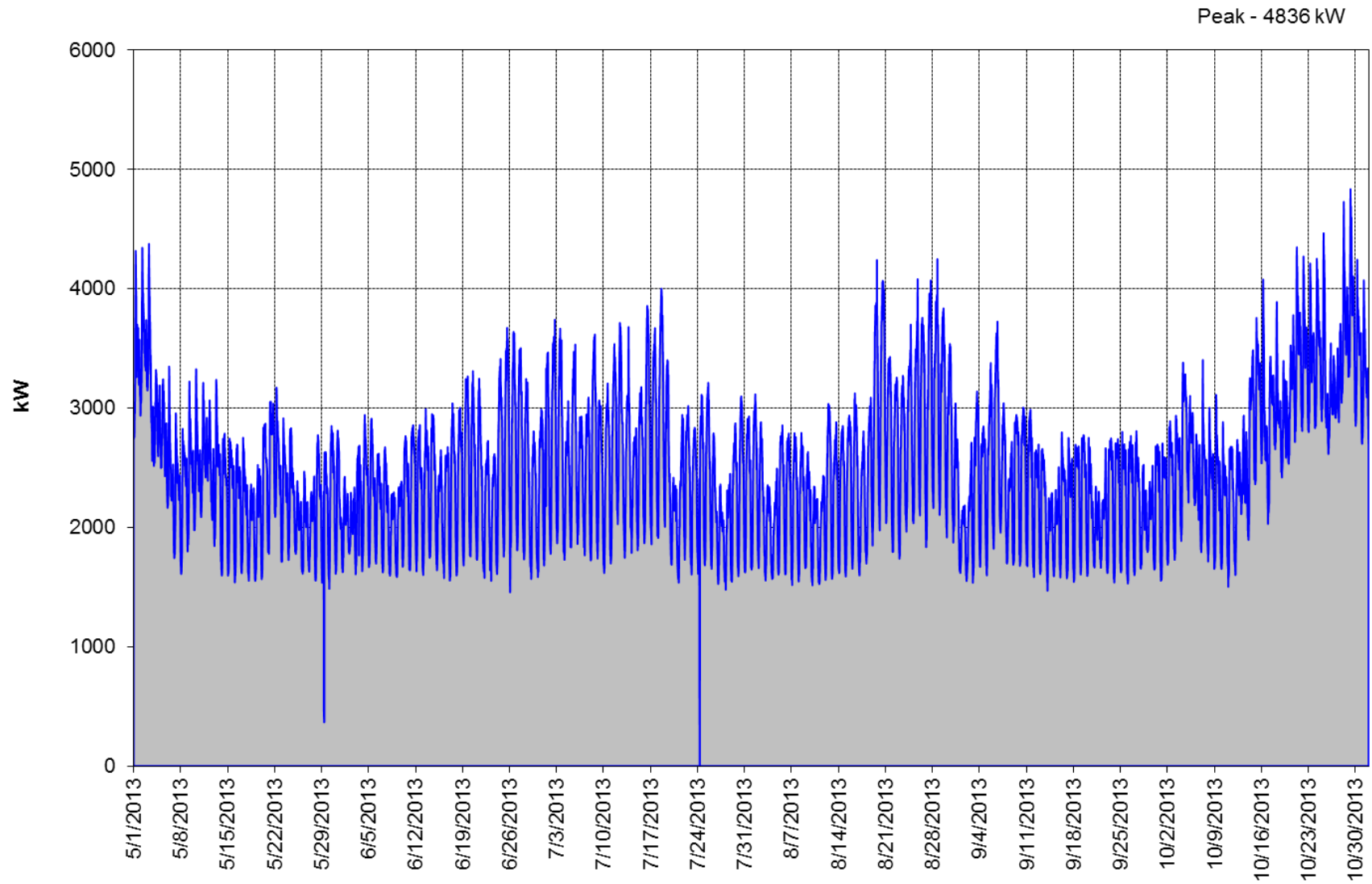
## Exhibit 5

### Hillsboro, ND Winter 2012-2013 Half-Hour Load Shape - Town Gate



## Exhibit 6

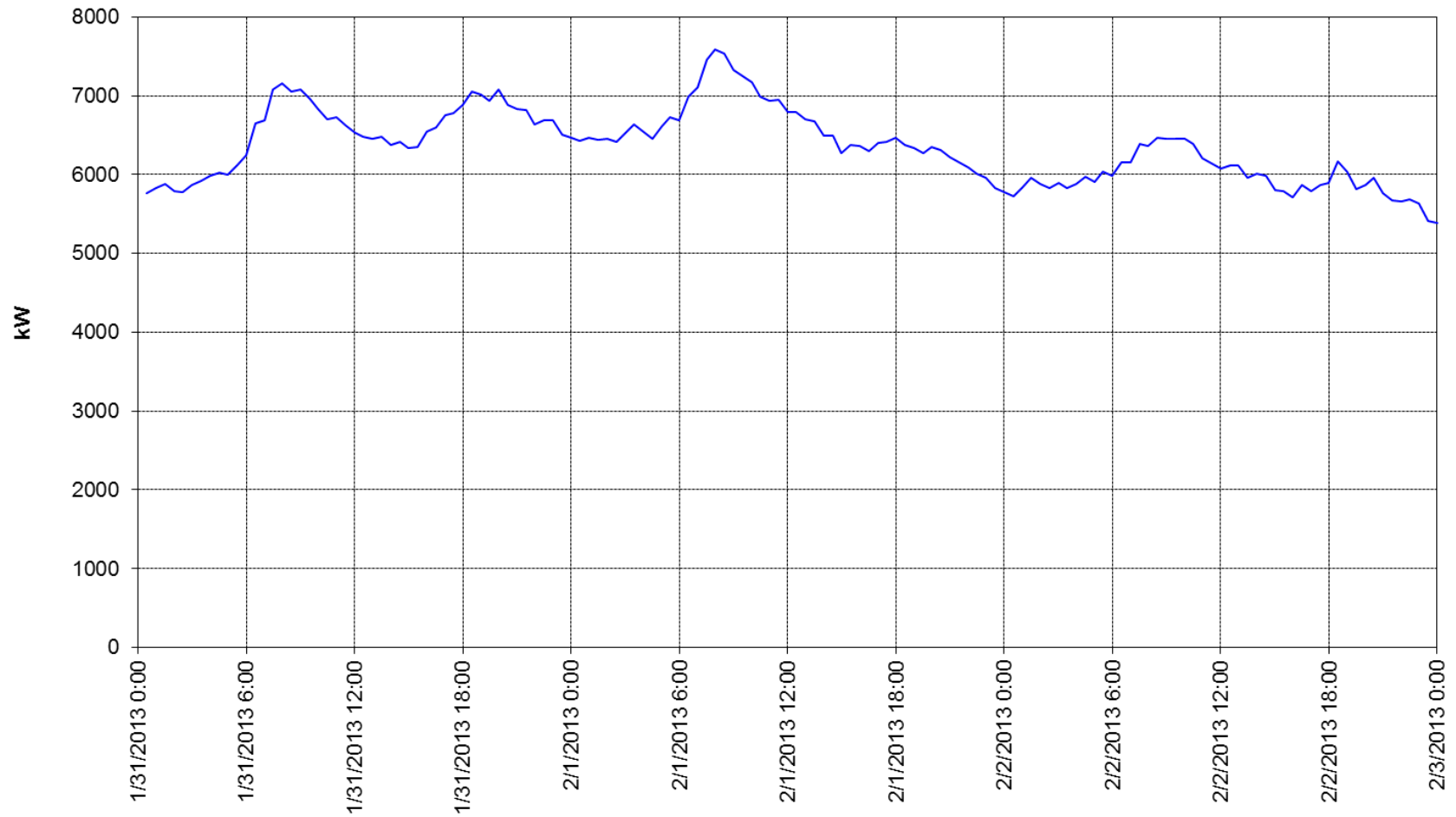
### Hillsboro, ND Summer 2013 Half-Hour Load Shape - Town Gate



## Exhibit 7

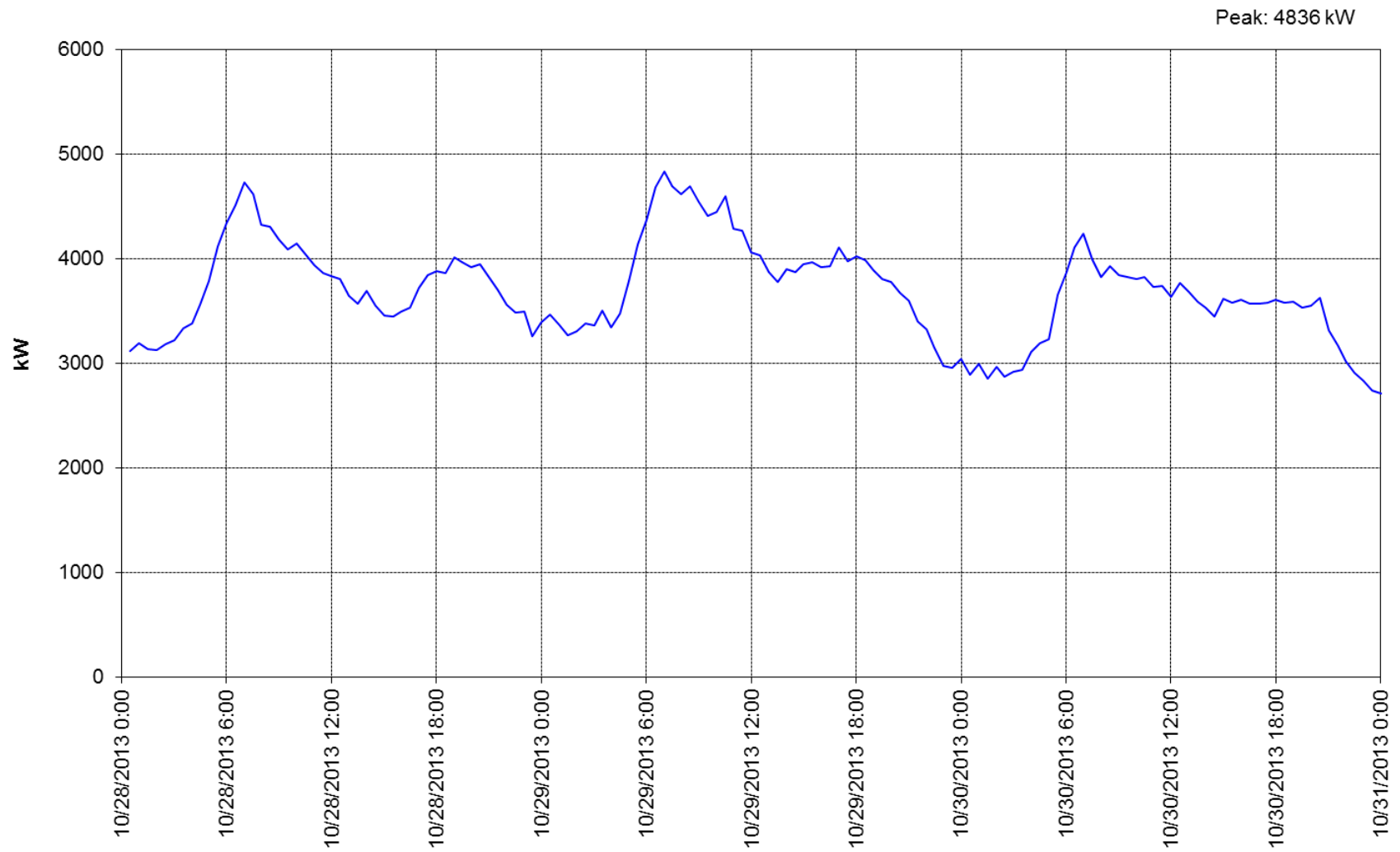
### Hillsboro, ND Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate

Peak: 7593 kW



## Exhibit 8

Hillsboro, ND Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Hillsboro is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Hillsboro to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Hillsboro has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2010	Energy Star Appliance	BES	8	\$ 118	0.0	541
	Lighting - Retrofit	BES	24	\$ 2,040	5.4	12,800
	Res HVAC	BES	2	\$ 1,804	4.5	22,435
<b>2010 Total</b>			<b>34</b>	<b>\$ 3,961</b>	<b>9.9</b>	<b>35,776</b>
2011	Custom Electric Program	BES	1	\$ 2,755	9.2	34,896
	Energy Star Appliance	BES	10	\$ 450	0.2	2,254
	Lighting - Retrofit	BES	54	\$ 324	0.9	2,575
<b>2011 Total</b>			<b>65</b>	<b>\$ 3,529</b>	<b>10.3</b>	<b>39,725</b>
2012	Comm Refrigeration Audit	BES	2	\$ -	0.3	2,591
	Energy Star Appliance	BES	13	\$ 575	0.2	2,841
	Lighting - New Const	BES	30	\$ 1,366	4.1	9,707
	Lighting - Retrofit	BES	29	\$ 725	1.4	12,441
<b>2012 Total</b>			<b>74</b>	<b>\$ 2,666</b>	<b>6.0</b>	<b>27,580</b>
2013	CI HVAC	BES	16	\$ 11,487	12.7	147,723
	Compressed Air System	BES	1	\$ 1,050	3.2	14,100
	Energy Star Appliance	BES	9	\$ 375	0.3	1,514
	Lighting - New Const	BES	211	\$ 8,330	31.0	107,376
	Lighting - Retrofit	BES	20	\$ 1,124	3.0	7,496
	Res HVAC	BES	1	\$ 200	0.4	6,470
	Specialty Measures	BES	1	\$ 50	0.0	100
	VFDs and Pumps	BES	20	\$ 15,600	96.1	365,328
<b>2013 Total</b>			<b>279</b>	<b>\$ 38,216</b>	<b>146.7</b>	<b>650,107</b>
<b>Grand Total</b>			<b>452</b>	<b>\$ 48,371</b>	<b>172.9</b>	<b>753,188</b>

- Load Management Program**

Description: Load management controls were installed on electric water heaters, and central air conditioners with a savings of approximately 1 MW, up until 2011 when the program was discontinued.

Energy Savings: Approximately 1 MW on peak, until 2011 when the program was discontinued.

### *D. Evaluation of Alternatives*

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and



economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Hillsboro was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

## ***E. Options Chosen – Development of Action Plan***

DSMware software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or is planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

### ***i. Future Actions***

It is assumed that Hillsboro will continue to participate in the Bright Energy Solutions program. Hillsboro would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Hillsboro will participate in all of the Bright Energy Solutions programs to the extent possible.

Representatives from Hillsboro plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, Hillsboro is pursuing participation in the MRES Coordinated Demand Response (CDR) program. The level of future participation is unknown, as implementation of the program has not yet begun.

### ***ii. Milestones***

As part of the annual WAPA IRP updates, Hillsboro will evaluate the progress on these programs. The success will be measured against this 5-year plan, with adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of

savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

#### ***F. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

#### ***G. Public Participation***

A preliminary draft of this report was produced on July 1, 2014. A notice of public hearing on IRP was published in the local newspaper on July 11, 2014. The public hearing on the IRP was held at the August 4, 2014 City Commission meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The City Council approved the resolution on August 4, 2014. A copy of the approved resolution is included in Appendix 2.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b>07/1/2014</b>
Date Published in Paper	<b>7/11/2014</b>
Public Hearing Date	<b>8/4/2014</b>
Date Approved by City Commission	<b>8/4/2014</b>

## Appendix 1 – Detailed DSM Measures Installed

Utility Hillsboro

Year	Program	Measure	BES or City	Quan	Incentive	kW	kWh
2010	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 50	0.0	225
		Energy Star Decorative Lights	BES	5	\$ 18	0.0	42
		Energy Star Dishwasher	BES	2	\$ 50	0.0	274
					<b>\$ 118</b>	<b>0.0</b>	<b>541</b>
	Lighting - Retrofit	Ltng Retrofit _ T8 Hi Bay Fixtures w- Elec Bal	BES	24	\$ 2,040	5.4	12,800
					<b>\$ 2,040</b>	<b>5.4</b>	<b>12,800</b>
	Res HVAC	Desuperheater	BES	1	\$ 250	0.6	1,221
		HVAC Closed Loop Water to Air GS HP	BES	1	\$ 1,554	3.9	21,214
					<b>\$ 1,804</b>	<b>4.5</b>	<b>22,435</b>
	<b>2010 Total</b>				<b>\$ 3,961</b>	<b>9.9</b>	<b>35,776</b>
2011	Custom Electric Program	replaced t-12 with t9	BES	1	\$ 2,755	9.2	34,896
					<b>\$ 2,755</b>	<b>9.2</b>	<b>34,896</b>
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 100	0.0	450
				2	\$ 100	0.0	450
				3	\$ 150	0.1	675
		Energy Star Dishwasher	BES	1	\$ 50	0.0	274
		Energy Star Refrigerators	BES	1	\$ 50	0.0	405
					<b>\$ 450</b>	<b>0.2</b>	<b>2,254</b>
	Lighting - Retrofit	Ltng Retro _Flrsnt T8 & T5 w/Elec Bal	BES	54	\$ 324	0.9	2,575
					<b>\$ 324</b>	<b>0.9</b>	<b>2,575</b>
	<b>2011 Total</b>				<b>\$ 3,529</b>	<b>10.3</b>	<b>39,725</b>
2012	Comm Refrigeration Audit	Coil Cleaning kit	BES	1	\$ -	0.2	2,180
		LED Screw-in Replacement Lamp	BES	1	\$ -	0.0	411
					<b>\$ -</b>	<b>0.3</b>	<b>2,591</b>
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 300	0.1	1,350
				3	\$ 150	0.1	675
		Energy Star Dishwasher	BES	1	\$ 75	0.0	411
		Energy Star Refrigerators	BES	1	\$ 50	0.0	405
					<b>\$ 575</b>	<b>0.2</b>	<b>2,841</b>
	Lighting - New Const	Ltng NC _ T8 4ft Hi Bay Fixture	BES	27	\$ 1,350	4.0	9,595
		Ltng NC _ T8 4ft Hi Performance	BES	3	\$ 16	0.0	112
					<b>\$ 1,366</b>	<b>4.1</b>	<b>9,707</b>
	Lighting - Retrofit	Ltng Retro _ LED & Induction Tech	BES	29	\$ 725	1.4	12,441
					<b>\$ 725</b>	<b>1.4</b>	<b>12,441</b>
	<b>2012 Total</b>				<b>\$ 2,666</b>	<b>6.0</b>	<b>27,580</b>
2013	CI HVAC	ECM in Res Style Furnace	BES	2	\$ 300	0.5	800
		GS HP_Closed Loop Water to Air	BES	3	\$ 6,000	5.5	118,620
		Mini Split Ductless Air Source HP	BES	2	\$ 400	0.9	12,940
		Setback/Programmable Thermostats	BES	2	\$ 100	0.0	3,822

	Split System Air Source HP <65k Btuh (3ph)	BES	6	\$	1,375	3.8	7,617
	Window Film	BES	1	\$	3,312	2.1	3,924
				\$	<b>11,487</b>	<b>12.7</b>	<b>147,723</b>
<b>Compressed Air System</b>	VFD Air Compressor	BES	1	\$	1,050	3.2	14,100
				\$	<b>1,050</b>	<b>3.2</b>	<b>14,100</b>
<b>Energy Star Appliance</b>	Energy Star Clothes Washer	BES	1	\$	200	0.1	524
	Energy Star Dishwasher	BES	3	\$	75	0.1	180
	Energy Star Refrigerators	BES	1	\$	100	0.1	810
				\$	<b>375</b>	<b>0.3</b>	<b>1,514</b>
<b>Lighting - New Const</b>	CEE Qual T8 4ft Hi Performance System	BES	33	\$	130	0.4	2,943
	LED Energy Star Recessed Downlight	BES	8	\$	200	0.5	1,058
	T5HO 4ft Hi Bay Fixture	BES	98	\$	6,380	23.2	53,363
	T8 4ft Hi Bay Fixture	BES	72	\$	1,620	6.8	50,012
				\$	<b>8,330</b>	<b>31.0</b>	<b>107,376</b>
<b>Lighting - Retrofit</b>	T8 4ft w/Elec Bal	BES	8	\$	104	0.3	1,181
	T8 Hi Bay Fixtures w/ 4ft Lamps	BES	12	\$	1,020	2.7	6,315
				\$	<b>1,124</b>	<b>3.0</b>	<b>7,496</b>
<b>Res HVAC</b>	HVAC Mini Split_Ductless Air_Source HP	BES	1	\$	200	0.4	6,470
				\$	<b>200</b>	<b>0.4</b>	<b>6,470</b>
<b>Specialty Measures</b>	Energy Star Clothes Washer - Elec WH	BES	1	\$	50	0.0	100
				\$	<b>50</b>	<b>0.0</b>	<b>100</b>
<b>VFDs and Pumps</b>	Hi_Eff Pumps	BES	4	\$	1,600	5.1	18,880
	Variable Freq Drives	BES	4	\$	1,000	6.5	20,362
			12	\$	13,000	84.5	326,086
				\$	<b>15,600</b>	<b>96.1</b>	<b>365,328</b>
<b>2013 Total</b>				\$	<b>38,216</b>	<b>146.7</b>	<b>650,107</b>
<b>Grand Total</b>				\$	<b>48,371</b>	<b>172.9</b>	<b>753,188</b>

## Appendix 2 – Hillsboro Resolution

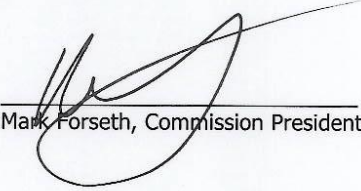
### RESOLUTION 2014-02

- WHEREAS,** the City of Hillsboro purchases a significant portion of its power supply from the Western Area Power Administration (Western); and
- WHEREAS,** Western has recently published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing of an Integrated Resource Plan (IRP); and
- WHEREAS,** the municipal utility staff has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and
- WHEREAS,** our customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and
- WHEREAS,** any public comments received have been addressed in order to strengthen the city's Integrated Resource Plan; and
- WHEREAS,** the IRP Summary report included 5-year and 2-year action plans outlining actions to be taken by the Municipal utility during the next several years.

NOW THEREFORE BE IT RESOLVED BY the City of Hillsboro City Commission as follows:

That the "Integrated Resource Plan Summary Report for the City of Hillsboro dated September 2014 shall be approved for filing with Western under the Energy Planning and Management Program."

Passed and approved this 4<sup>th</sup> Day of August, 2014.

  
Mark Forseth, Commission President

ATTEST:

  
Lesley Connelly, Auditor

## **VI. Pierre, SD Resource Planning**

### **A. *City Information***

Pierre, located in Hughes County, is the capital of South Dakota and is a community of more than 13,600 individuals located in central South Dakota. The residential sector includes 6,159 housing units, and the median age of the population is 39.3 years. About 13.9% of the population is 65 years of age or older and about 22.9% percent are under 18 years old.

In 2012, the municipal utility had 6,002 residential customers, 1,016 commercial customers, and 182 industrial customers. The residential sector's yearly usage averaged 11,602 kWh per customer in 2012. Commercial customers averaged 25,790 kWh, and industrial customers averaged 484,769 kWh.

The rates for each type of customer are shown on the rate sheet in Exhibit 1. Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4, which show the winter and summer peak demand and energy for 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Pierre on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 36,264 kW in the winter and 41,902 kW in the summer.

Exhibits 7 and 8 each show the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load remaining flat from midnight to roughly 5 am then increasing till 8 am. The load then begins to decline until 4 pm followed by an increase until 6 pm. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline occurs until 6 am the next day.

## Exhibit 1

### PIERRE, SOUTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$10.00
	\$/kWh Jun-Aug	\$.088
	\$/kWh Sep-May	
	First 1,000	\$.082
	Over 1,000	\$.072
Small Commercial	Customer Charge	\$19.15
	\$/kWh Jun-Aug	\$.091
	\$/kWh Sep-May	\$.085
Large Commercial	Customer Charge	\$35.00
	\$/kW Jun-Aug	\$14.60
	\$/kW Sep-May	\$12.75
	\$/kWh	\$.037

## Exhibit 2

MRES Seasonal Load Report  
Pierre, SD  
Town Gate Load  
BASE Forecast

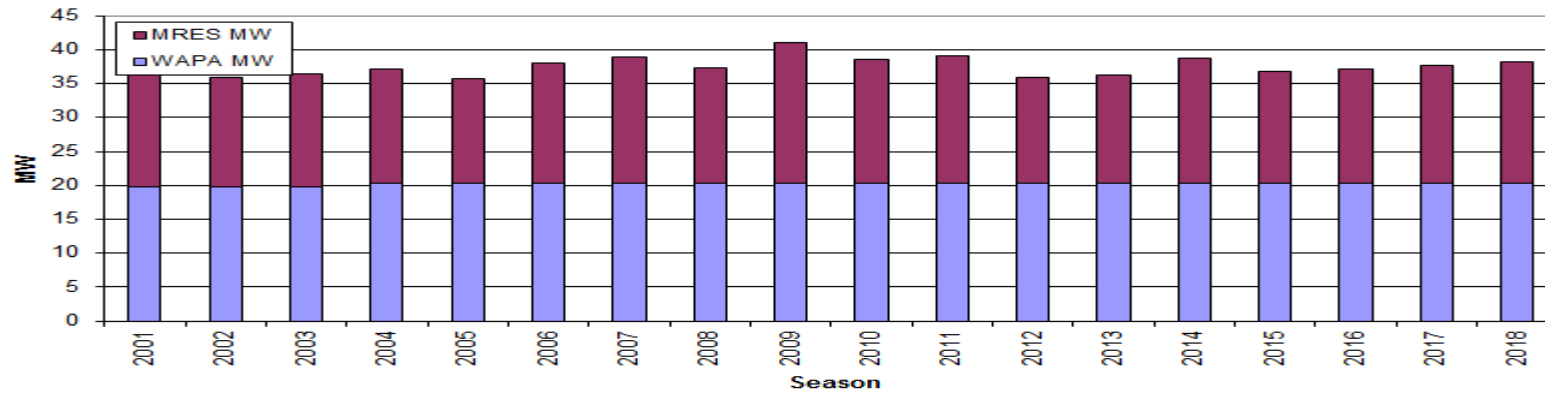
1/31/14 2:14 PM  
Town Gate Load  
Monthly Splits  
Historic Through 12/2013

Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	42,055	26,952	17,139	0	2001	90,599,084	62,607,000	27,992,084	0
2002	42,343	27,626	18,894	0	2002	94,197,912	62,607,000	31,590,912	0
2003	41,032	26,952	17,583	0	2003	91,900,445	62,607,000	29,293,445	0
2004	40,774	26,952	17,325	0	2004	87,644,023	62,607,000	25,037,023	0
2005	39,592	26,952	14,695	0	2005	92,674,224	62,607,000	30,067,224	0
2006	44,483	27,581	21,072	0	2006	100,470,836	62,504,000	37,966,836	0
2007	45,525	26,908	22,114	0	2007	99,044,825	62,504,000	36,540,825	0
2008	39,320	26,908	15,909	0	2008	92,508,453	62,504,000	30,004,453	0
2009	39,340	26,908	14,260	0	2009	91,636,661	62,504,000	29,132,661	0
2010	41,154	27,581	17,274	0	2010	94,580,014	62,504,000	32,076,014	0
2011	44,824	27,581	21,413	0	2011	93,555,860	62,504,000	31,051,860	0
2012	44,462	26,908	21,051	0	2012	96,548,941	62,504,000	34,044,941	0
2013	41,902	26,908	17,931	0	2013	92,862,640	62,504,000	30,358,640	0
2014	40,222	26,908	15,708	0	2014	91,809,772	62,504,000	29,305,772	0
2015	40,722	26,908	16,195	0	2015	92,951,460	62,504,000	30,447,460	0
2016	41,222	26,993	16,681	0	2016	94,093,352	62,504,000	31,589,352	0
2017	41,722	27,320	17,168	0	2017	95,235,454	62,504,000	32,731,454	0
2018	42,223	27,581	17,655	0	2018	96,377,772	62,504,000	33,873,772	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	34,303	19,806	16,022	0	2002	88,889,855	50,798,000	38,091,855	0
2003	36,457	19,806	16,651	0	2003	90,983,891	50,798,000	40,185,891	0
2004	37,087	20,280	16,807	0	2004	91,238,344	52,354,000	38,884,344	0
2005	35,645	20,280	15,365	0	2005	90,855,179	52,012,000	38,843,179	0
2006	35,521	20,236	17,782	0	2006	92,948,867	51,934,000	41,014,867	0
2007	38,407	20,236	18,664	0	2007	96,029,369	51,899,000	44,130,369	0
2008	37,297	20,236	17,061	0	2008	97,026,976	52,240,000	44,786,976	0
2009	39,668	20,236	20,837	0	2009	99,272,381	51,899,000	47,373,381	0
2010	38,483	20,236	18,255	0	2010	98,199,947	51,899,000	46,300,947	0
2011	38,576	20,236	18,833	0	2011	99,950,173	51,899,000	48,051,173	0
2012	35,648	20,236	15,683	0	2012	89,298,758	52,240,000	37,058,758	0
2013	36,264	20,236	16,028	0	2013	94,898,050	51,899,000	42,999,050	0
2014	36,302	20,236	18,524	0	2014	96,038,396	51,899,000	44,139,396	0
2015	36,753	20,236	16,517	0	2015	95,295,912	51,899,000	43,396,912	0
2016	37,205	20,236	16,969	0	2016	96,471,473	52,240,035	44,231,438	0
2017	37,656	20,236	17,420	0	2017	97,647,246	51,899,000	45,748,246	0
2018	38,108	20,236	17,872	0	2018	98,823,240	51,899,000	46,924,240	0

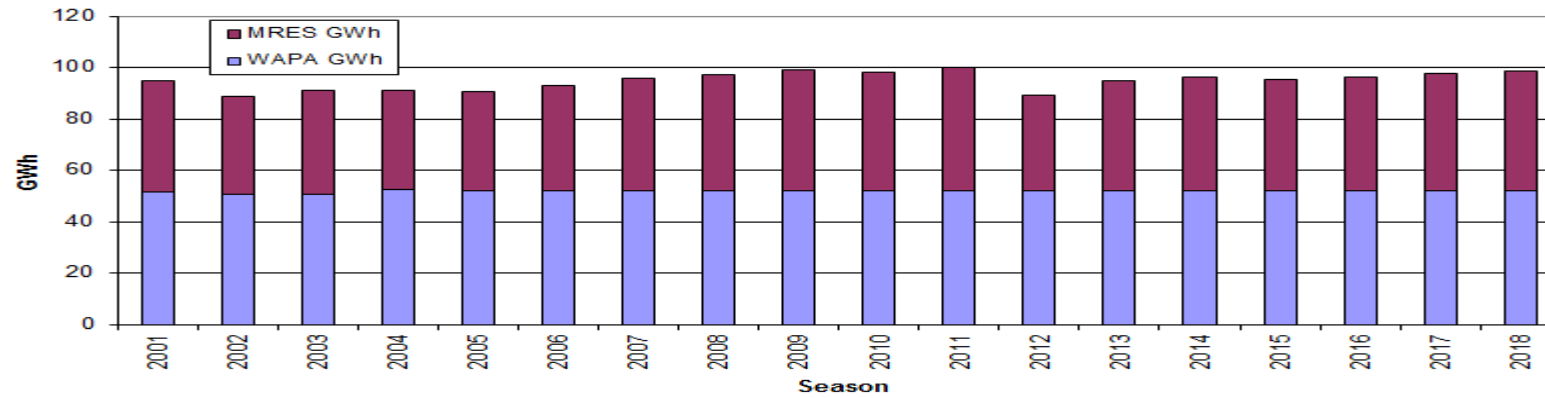


### Exhibit 3

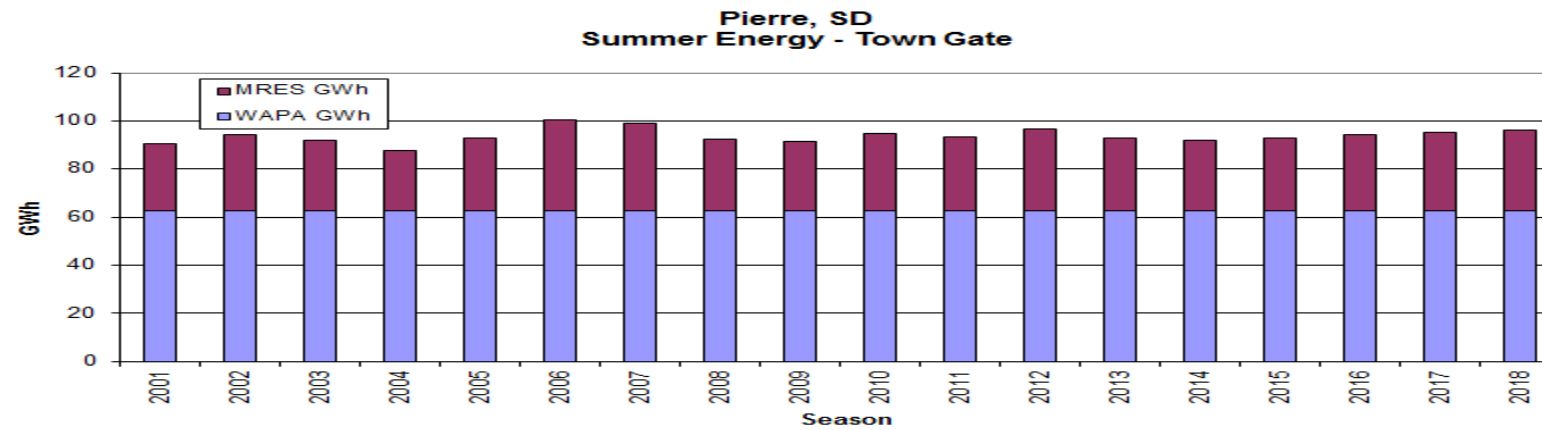
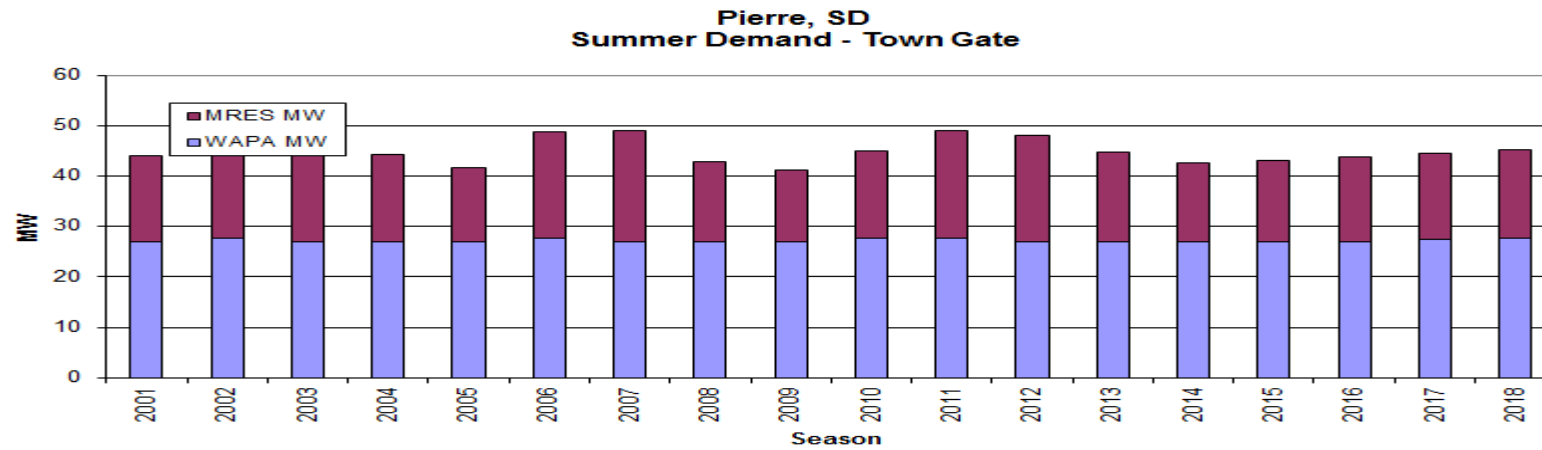
**Pierre, SD  
Winter Demand - Town Gate**



**Pierre, SD  
Winter Energy - Town Gate**

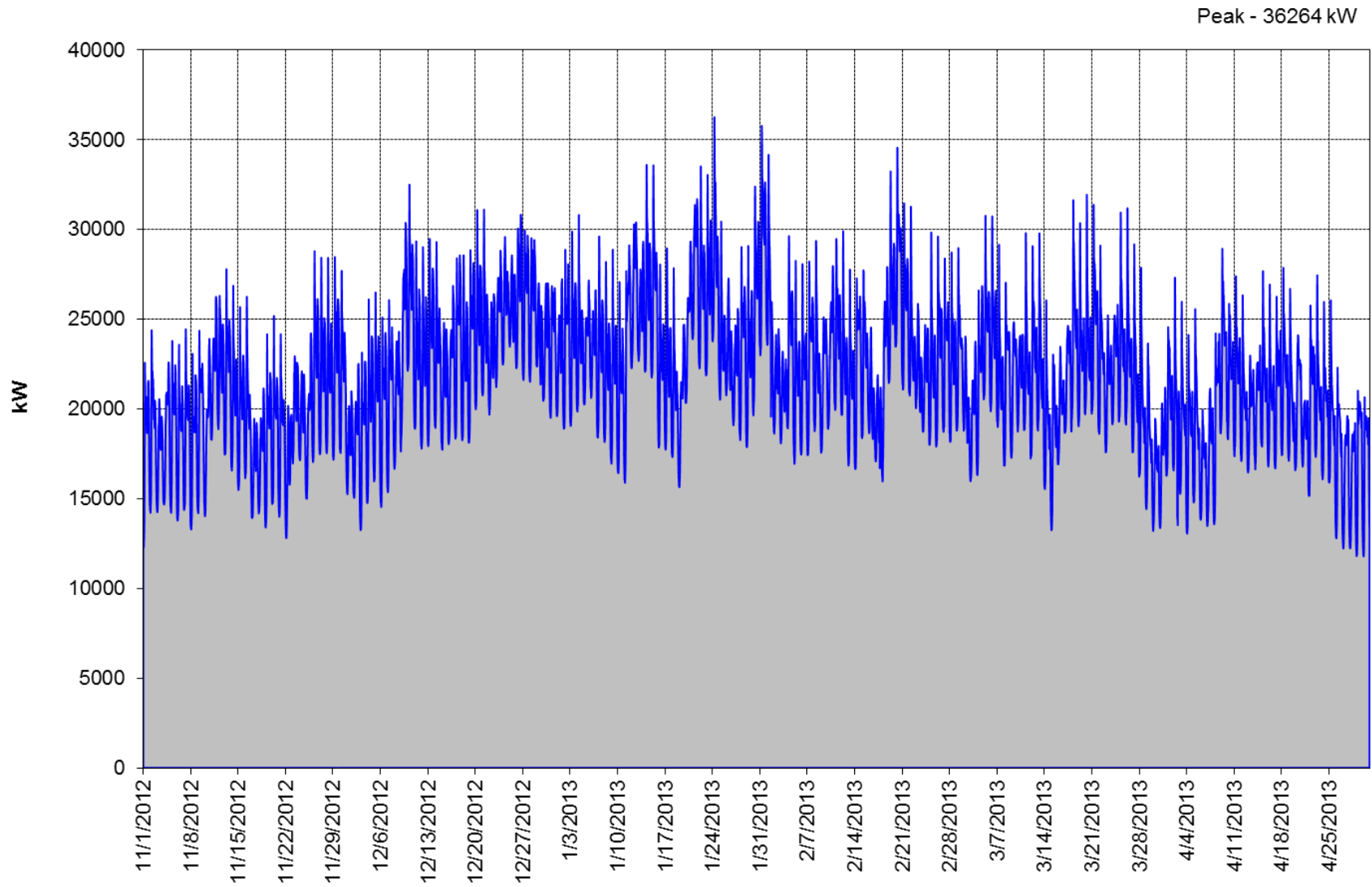


## Exhibit 4



## Exhibit 5

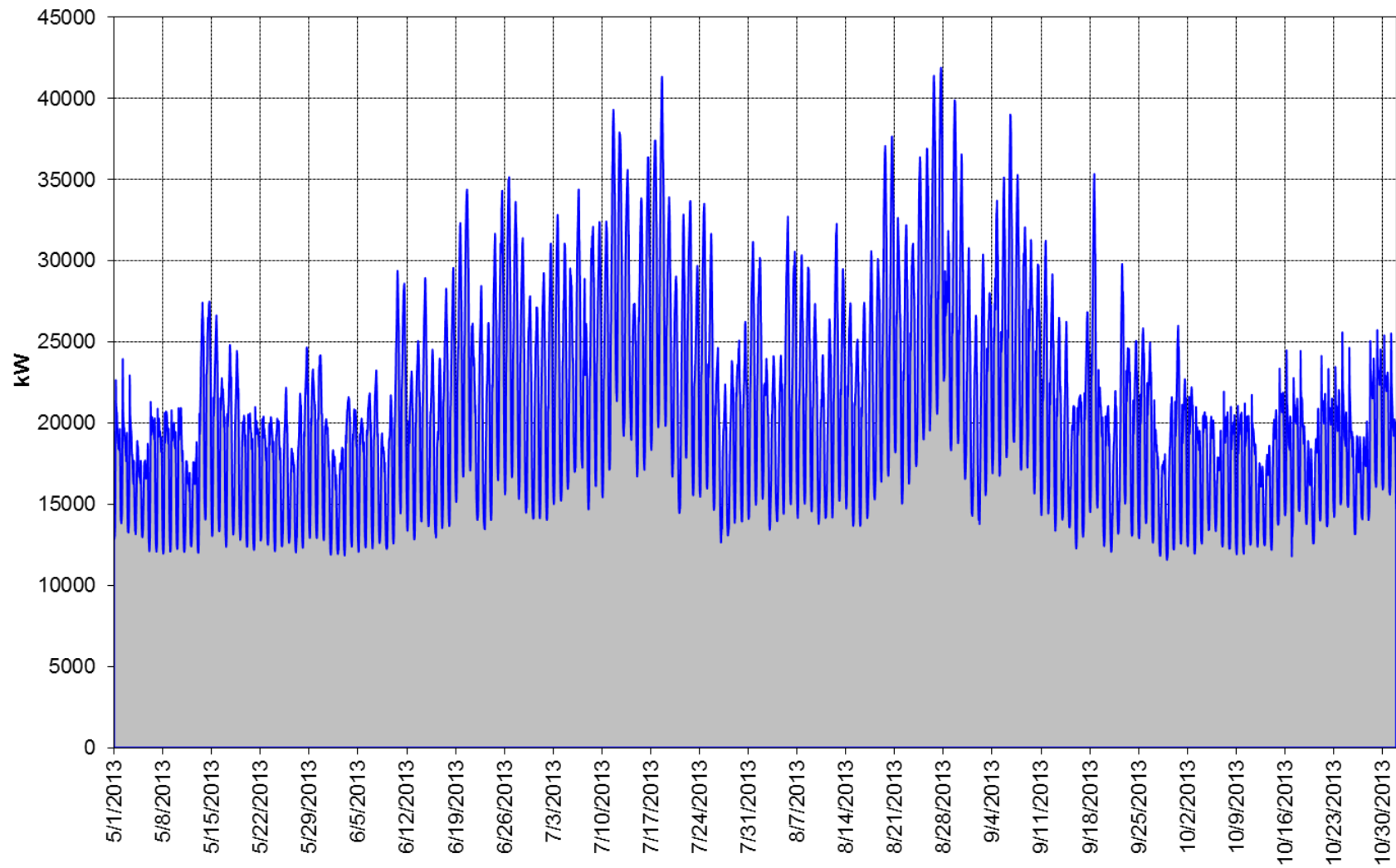
Pierre, SD Winter 2012-2013 Half-Hour Load Shape - Town Gate



## Exhibit 6

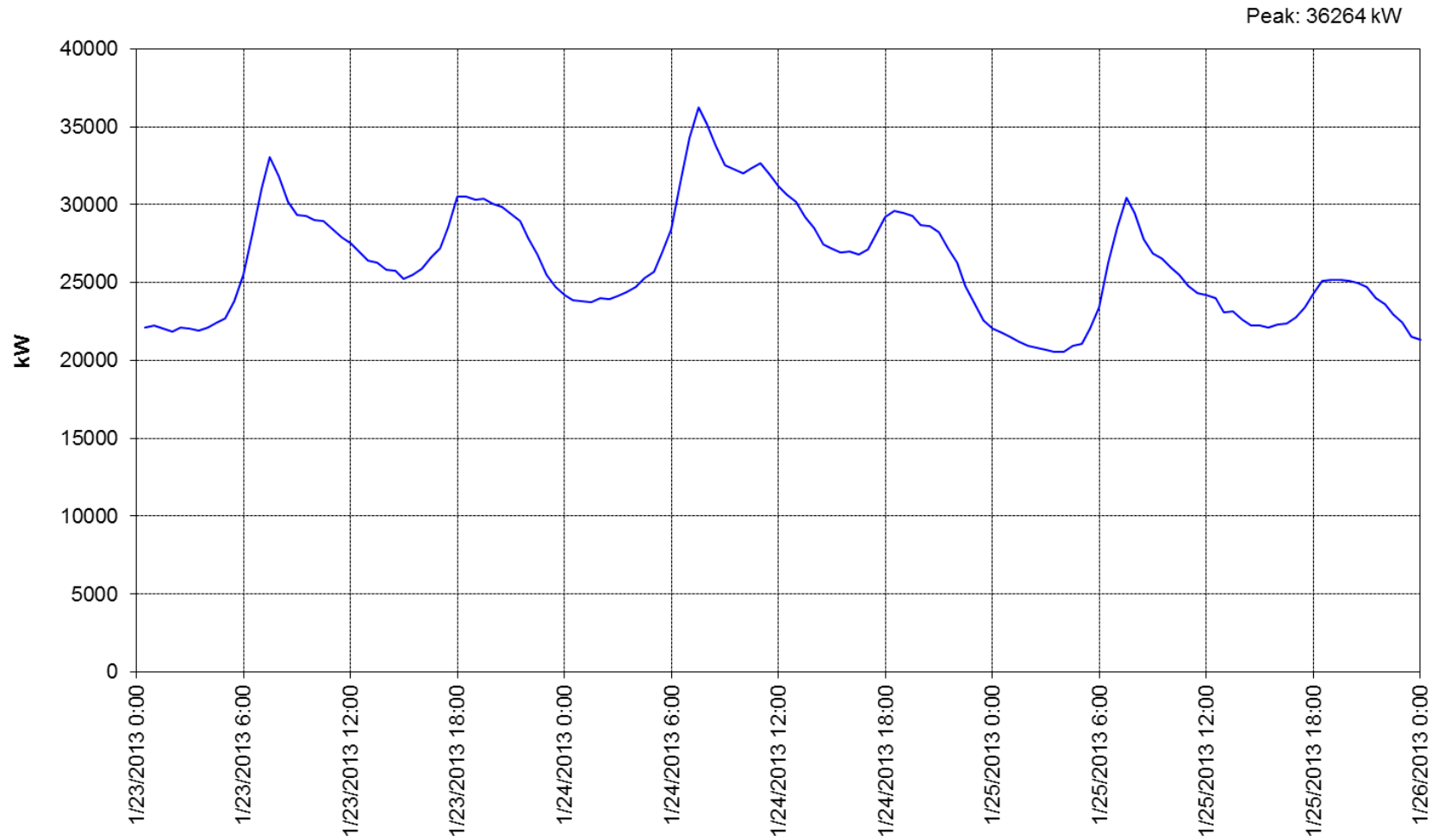
### Pierre, SD Summer 2013 Half-Hour Load Shape - Town Gate

Peak - 41902 kW



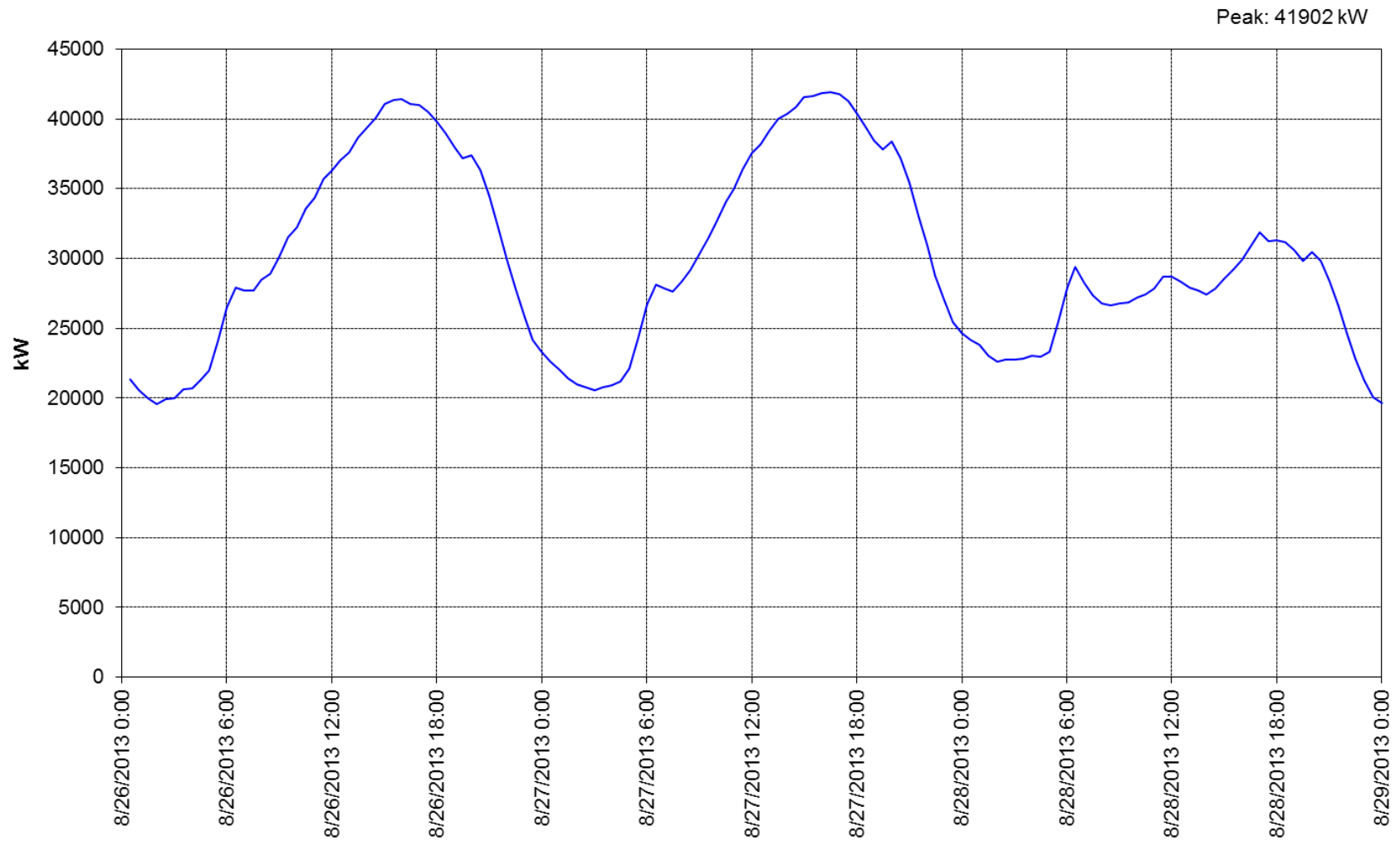
## Exhibit 7

Pierre, SD Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate



## Exhibit 8

Pierre, SD Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Pierre is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Pierre to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Pierre has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2009	Cooling	BES	17	\$ 2,750	4.1	6,806
	Custom Lighting	BES	2	\$ 3,846	12.8	39,514
	Energy Star Appliance	BES	50	\$ 4,471	2.4	17,175
	Lighting	BES	253	\$ 15,104	32.5	131,483
	Lighting	BES	8	\$ 680	1.2	5,144
	Lighting - New Const	BES	12		2.8	12,264
	Motors	BES	5	\$ 2,425	12.5	46,051
	Res HVAC	BES	9	\$ 5,100	7.6	18,792
	VFDs and Pumps	BES	2	\$ 1,800	10.1	37,210
	Res Lighting	BES	192	\$ 288	0.8	9,600
<b>2009 Total</b>			<b>550</b>	<b>\$ 36,463</b>	<b>86.9</b>	<b>324,039</b>
2010	CI HVAC	BES	8	\$ 400	2.6	6,576
	Custom Electric Program	BES	7	\$ 7,832	26.1	257,664
	Energy Star Appliance	BES	384	\$ 9,991	3.0	42,758
	Lighting - Retrofit	BES	4556	\$ 44,125	123.8	422,933
	Res HVAC	BES	125	\$ 20,900	33.3	103,138
	Specialty Measures	BES	1	\$ 50	0.0	225
<b>2010 Total</b>			<b>5081</b>	<b>\$ 83,297</b>	<b>188.9</b>	<b>833,294</b>
2011	CI HVAC	BES	7	\$ 350	2.3	5,754
	Custom Electric Program	BES	6	\$ 3,639	15.9	38,605
	Energy Star Appliance	BES	172	\$ 6,064	2.8	32,825
	Food Service	BES	1	\$ 150	0.1	790
	Lighting - New Const	BES	90	\$ 1,052	2.1	8,717
	Lighting - Retrofit	BES	9753	\$ 73,329	300.9	1,045,426
	Res HVAC	BES	125	\$ 12,950	21.2	90,261
	Specialty Measures	BES	1	\$ 50	0.0	225
	VFDs and Pumps	BES	2	\$ 240	1.0	2,759
	Res Lighting	BES	415	\$ 623	1.7	16,113
<b>2011 Total</b>			<b>10572</b>	<b>\$ 98,445</b>	<b>348.0</b>	<b>1,241,475</b>
2012	CI HVAC	BES	21	\$ 5,460	19.7	22,182
	Custom Electric Program	BES	5	\$ 14,136	36.7	342,991
	Energy Star Appliance	BES	153	\$ 5,845	2.8	30,813
	Food Service	BES	1	\$ 300	0.3	2,695
	Lighting - New Const	BES	378	\$ 8,550	27.1	97,285
	Lighting - Retrofit	BES	1585	\$ 21,805	69.3	233,001
	Res HVAC	BES	73	\$ 7,250	16.6	40,151
	VFDs and Pumps	BES	2	\$ 400	2.6	7,137
	Res Lighting	BES	108	\$ 162	0.4	4,193
<b>2012 Total</b>			<b>2326</b>	<b>\$ 63,908</b>	<b>175.5</b>	<b>780,448</b>
2013	CI HVAC	BES	5	\$ 650	1.1	19,884
	Custom Electric Program	BES	4	\$ 2,829	9.6	28,582
	Energy Star Appliance	BES	162	\$ 6,645	4.5	25,277
	Lighting - New Const	BES	178	\$ 6,374	23.4	64,169
	Lighting - Retrofit	BES	5886	\$ 39,789	129.3	404,102
	Res HVAC	BES	243	\$ 23,825	82.4	108,428
	Res Lighting	BES	142	\$ 213	0.7	6,219
	Comm Refrigeration	BES	16	\$ 840	1.7	27,645
<b>2013 Total</b>			<b>6636</b>	<b>\$ 81,164</b>	<b>252.7</b>	<b>684,306</b>
<b>Grand Total</b>			<b>25165</b>	<b>\$ 363,278</b>	<b>1,052.0</b>	<b>3,863,562</b>



## ***D. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Pierre was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

## ***E. Options Chosen – Development of Action Plan***

DSM software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or is planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

### ***i. Future Actions***

It is assumed that Pierre will continue to participate in the Bright Energy Solutions program. Pierre would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Pierre will participate in all of the Bright Energy Solutions programs to the extent possible, with the exception of the residential appliance turn-in measures, where Pierre Utility personnel has identified that participation levels might be reduced due to the lack of market potential and appliance retailers in the area. This assumption was made only to obtain more realistic expectations for the five-year plan, and is certainly not considered to be a cap on participation in the event that the program attracts more participants than anticipated.

Representatives from Pierre plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, Pierre is pursuing participation in the MRES Coordinated Demand Response (CDR) program. The level of future participation is unknown, as implementation of the program has not yet begun.

### ***ii. Milestones***

As part of the annual WAPA IRP updates, Pierre will evaluate the progress on these programs. The success will be measured against this 5-year plan, with

adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

#### ***F. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

#### ***G. Public Participation***

A preliminary draft of this report was produced on June 17, 2014. A notice of public hearing on IRP was published in the local newspaper on August 1, 2014. The public hearing on the IRP was held at the August 12, 2014 City Commission meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The City Commission approved the resolution on August 12, 2014. A copy of the approved resolution is included in Appendix 2.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b>6/17/2014</b>
Date Published in Paper	<b>8/1/2014</b>
Public Hearing Date	<b>8/12/2014</b>
Date Approved by City Council	<b>8/12/2014</b>

## Appendix 1 – Detailed DSM Measures Installed

Utility Pierre

Year	Program	Measure	BES or City	Quan	Incentive	kW	kWh
2009	Cooling	CA 1.5 ton	BES	14	\$ 750	1.1	588
		CA 2 ton	BES	2		0.2	84
		Spilt system 10.2 EER	BES	1	\$ 2,000	2.8	6,134
					<b>\$ 2,750</b>	<b>4.1</b>	<b>6,806</b>
	Custom Lighting	T8 4' 4L low wattage	BES	1	\$ 3,492	11.6	35,100
		T8 HB 6L	BES	1	\$ 354	1.2	4,414
					<b>\$ 3,846</b>	<b>12.8</b>	<b>39,514</b>
	Energy Star Appliance	Amana NFW7200TW	BES	1	\$ 50	0.0	165
		ATF7000F	BES	1	\$ 150	0.1	495
		DDR3009EE	BES	1	\$ 10	0.1	92
		DDR5009REE	BES	1	\$ 10	0.1	92
		Electrolux EWFLW65HTS	BES	1	\$ 50	0.0	165
		FAFW3511KW	BES	1	\$ 50	0.0	165
		FDR25S1	BES	1	\$ 10	0.1	92
		Frididaire FAFW3574KW	BES	1	\$ 50	0.0	165
		Frigidaire AFT7000FS	BES	1	\$ 100	0.1	330
		Frigidaire ATF6700FSI	BES	1	\$ 50	0.0	165
		Frigidaire ATF8000FSI	BES	1	\$ 150	0.1	495
		Frigidaire GLD2445RES	BES	1	\$ 25	0.0	144
		Frigidaire GLD4355RES	BES	1	\$ 25	0.0	144
		GE EWA5600KWV	BES	1	\$ 50	0.0	165
		GE GDWT160ROSS	BES	1	\$ 25	0.0	144
		GE Profile PDW1860NSS	BES	1	\$ 25	0.0	144
		GE WPRE6150K2WT	BES	1	\$ 50	0.0	165
		GLD4355RFB3	BES	1	\$ 25	0.0	144
		GLD4355RFS3	BES	1	\$ 25	0.0	144
		GU2275XTV	BES	1	\$ 25	0.0	144
		Kenmore 49962	BES	1	\$ 50	0.0	165
		KUDS30IVSS	BES	1	\$ 25	0.0	144
		LG WM2016CW	BES	1	\$ 200	0.1	660
		LG WM2233HW	BES	1	\$ 50	0.0	165
		Maytag MDB6701AWN	BES	1	\$ 25	0.0	144
		Maytag MDB7851AWB	BES	1	\$ 25	0.0	144
		Maytag MDC4650AWB1	BES	1	\$ 25	0.0	144
		Maytag MHWE500*	BES	1	\$ 50	0.0	165
		NFW7200TW	BES	1	\$ 50	0.0	165
		Samsung WF328AAW	BES	1	\$ 50	0.0	165
		WPMC8440UC	BES	1	\$ 50	0.0	165
		WFW9450WN	BES	1	\$ 50	0.0	165
		Whirlpool GU2275XTVBO	BES	1	\$ 25	0.0	144
		Whirlpool GU2275XTVQ	BES	1	\$ 25	0.0	144
		Whirlpool PWTW57ESVN	BES	1	\$ 50	0.0	165
		WL37T26DU02	BES	1	\$ 50	0.0	165

	WM2016CW	BES	1	\$	50	0.0	165
	WM2101HW	BES	1	\$	50	0.0	165
	WPGT9150HWW	BES	1	\$	50	0.0	165
	WTW57ESVW	BES	1	\$	50	0.0	165
	WTW6800WW	BES	1	\$	50	0.0	165
	(blank)	BES	(blank)	\$	2,416	0.7	9,417
	CFL Fixtures and Lamps	BES	1	\$	50	0.0	165
				\$	<b>4,471</b>	<b>2.4</b>	<b>17,175</b>
Lighting	LED wall mount	BES	1			0.0	747
	Occup. Sensors	BES	33			2.4	9,075
	Switching controls	BES	1	\$	106	2.7	4,832
	T5 HO 6L	BES	25	\$	1,750	3.7	16,075
	T8 4' 2L	BES	31	\$	9,627	0.5	1,705
	T8 4' 3L	BES	3			0.1	357
	T8 4' 4L	BES	2	\$	126	0.7	252
			18			0.6	2,268
	T8 HB 6L	BES	3			0.4	1,929
			27	\$	3,495	6.6	28,836
			100			14.7	64,300
	CFL Fixtures and Lamps	BES	9			0.3	1,107
				\$	<b>15,104</b>	<b>32.5</b>	<b>131,483</b>
Lighting	T8 HB 6L	BES	8	\$	680	1.2	5,144
				\$	<b>680</b>	<b>1.2</b>	<b>5,144</b>
Lighting - New Const	T5HO 4L	BES	12			2.8	12,264
						<b>2.8</b>	<b>12,264</b>
Motors	5HP Motor	BES	2	\$	2,425	0.1	174
	7.5HP Motor	BES	1			0.1	398
	VFD 15HP	BES	1			3.4	12,403
	VFD 40HP	BES	1			9.0	33,076
				\$	<b>2,425</b>	<b>12.5</b>	<b>46,051</b>
Res HVAC	15 SEER HP	BES	1	\$	400	0.1	76
	16 SEER HP	BES	1	\$	400	0.1	103
	16.75 SEER HP	BES	1			0.1	103
	ECM motor-ASHP	BES	1			0.1	968
	ECM-air handler	BES	1			0.1	968
	ECM-gas furnace	BES	1	\$	550	0.5	2,433
	Heat pump-air source	BES	1	\$	400	0.1	103
	(blank)	BES	(blank)	\$	3,350	6.3	14,038
				\$	<b>5,100</b>	<b>7.6</b>	<b>18,792</b>
VFDs and Pumps	20 HP VFD	BES	1			4.5	16,538
	25 HP VFD	BES	1	\$	1,800	5.6	20,672
				\$	<b>1,800</b>	<b>10.1</b>	<b>37,210</b>
Res Lighting	192 CFL bulbs	BES	192	\$	288	0.8	9,600
				\$	<b>288</b>	<b>0.8</b>	<b>9,600</b>
2009 Total				\$	<b>36,463</b>	<b>86.9</b>	<b>324,039</b>
2010	CI HVAC	Setback Thermostats	BES	3	\$	150	2,466
				5	\$	250	4,110
					\$	<b>400</b>	<b>6,576</b>
	Custom Electric Program	Custom	BES	1	\$	3,151	30,098
		Custom Lighting	BES	1	\$	226	1,564

	Replaced 12 4 lamp F32T8 with 12 2 lamp F28T8.	BES	1	\$	212	0.7	517
	Replace T8 Lighting with Low Wattage T8 and reflectors.	BES	1	\$	659	2.2	5,143
	Replace 6 - 250 watt metal halide w 2 lamp F28T8 fixture	BES	1	\$	396	1.3	193,350
	Retrofit 88 4 lamp F32T8 fixtures with 2 - F28T8 fixtures	BES	1	\$	1,241	4.1	10,753
	Convert 110 - 4 lamp F32T8 to 2 lamp F28T8	BES	1	\$	1,947	6.5	16,239
				\$	<b>7,832</b>	<b>26.1</b>	<b>257,664</b>
Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$	50	0.0	225
			2	\$	100	0.0	450
			4	\$	200	0.1	900
			6	\$	300	0.1	1,350
			8	\$	800	0.3	3,600
			9	\$	450	0.2	2,025
			14	\$	700	0.3	3,150
			15	\$	750	0.3	3,375
			22	\$	1,100	0.4	4,552
			29	\$	1,450	0.5	5,729
	Energy Star Decorative Lights	BES	33	\$	1,650	0.6	6,231
			10	\$	35	0.0	85
			15	\$	53	0.0	127
			131	\$	459	0.0	1,108
			1	\$	20	0.0	176
	Energy Star Dishwasher	BES	1	\$	50	0.0	274
			2	\$	100	0.0	548
			4	\$	300	0.0	1,644
			5	\$	250	0.0	1,370
			6	\$	150	0.0	822
			18	\$	450	0.0	2,286
			23	\$	575	0.0	2,731
				\$	<b>9,991</b>	<b>3.0</b>	<b>42,758</b>
Lighting - Retrofit	Ltng Retrofit _ CFL Fixtures & Lamps	BES	11	\$	242	0.6	2,223
			54	\$	81	1.9	6,245
	Ltng Retrofit _ LED & Induction Tech	BES	1	\$	12	0.0	166
			4	\$	96	0.2	1,332
			13	\$	480	0.2	2,846
	Ltng Retrofit _ Othr Eff Ltg Tech/Unit	BES	2	\$	40	0.1	375
			6	\$	120	0.3	1,434
			10	\$	400	1.2	4,321
	Ltng Retrofit _ Flrscnt T8 & T5 w/Elec Bal	BES	42	\$	868	3.9	18,441
			54	\$	1,350	4.1	17,936
			153	\$	3,090	8.7	29,211
			204	\$	3,093	9.3	31,797
			344	\$	7,528	22.5	80,623
	Ltng Retrofit _ T8 Hi Bay Fixtures w-Elec Bal	BES	7	\$	490	2.1	4,342
			29	\$	2,305	6.3	19,692
			34	\$	2,890	7.5	46,441

Res HVAC			48	\$	4,080	13.9	37,760	
			84	\$	5,880	15.4	41,278	
	Ltng Retrofit _ Rducd Wtg Flr T8 Lamps	BES	163	\$	82	0.6	2,288	
			180	\$	90	0.8	3,139	
			425	\$	213	1.5	3,842	
			893	\$	447	3.7	10,462	
			946	\$	473	3.8	11,483	
	Ltng Retrofit _ Rducd Wtg T8 CEE Qual	BES	24	\$	432	0.6	2,288	
			28	\$	250	0.4	1,369	
			136	\$	2,439	3.5	12,918	
			147	\$	1,332	2.4	6,633	
			485	\$	4,373	6.2	16,695	
	Ltng Retrofit _ Hi Perf T8 CEE Qual	BES	20	\$	600	1.5	3,821	
	Ltng Retrofit _ T5HO Hi Bay Fixtures w- Elec Bal	BES	5	\$	350	0.6	1,532	
				\$	44,125	123.8	422,933	
	Air Handler _ Fan Coil with ECM	BES	1	\$	300	0.5	800	
			2	\$	600	0.9	1,600	
			3	\$	450	0.7	1,200	
			4	\$	600	0.9	1,600	
			5	\$	750	1.2	2,000	
	HVAC Air_Source HP	BES	1	\$	500	0.8	3,962	
			2	\$	500	0.8	3,962	
			3	\$	750	1.2	5,943	
			6	\$	1,500	2.4	11,886	
			9	\$	2,250	3.6	17,829	
	HVAC Central AC unit	BES	1	\$	600	1.7	1,108	
			3	\$	900	2.3	1,625	
			5	\$	500	1.1	786	
	HVAC HE Furnace with ECM	BES	1	\$	300	0.5	800	
			2	\$	600	0.9	1,600	
			3	\$	900	1.4	2,400	
			4	\$	600	0.9	1,600	
			5	\$	750	1.2	2,000	
			6	\$	900	1.4	2,400	
			7	\$	1,050	1.6	2,800	
		9	\$	1,350	2.1	3,600		
		12	\$	1,800	2.8	4,800		
	HVAC HP Water Heater	BES	1	\$	300	0.3	2,830	
	HVAC Mini Split_Ductless Air_Source HP	BES	2	\$	400	0.9	12,940	
	HVAC Air-Source Heat Pump	BES	2	\$	1,000	0.8	6,324	
			3	\$	750	0.6	4,743	
				\$	20,900	33.3	103,138	
Specialty Measures	Energy Star Clothes Washer	BES	1	\$	50	0.0	225	
				\$	50	0.0	225	
2010 Total				\$	83,297	188.9	833,294	
2011	CI HVAC	Setback Thermostats	BES	2	\$	100	0.7	1,644
				5	\$	250	1.6	4,110
					\$	350	2.3	5,754
Custom Electric	Custom	BES	1	\$	1,499	8.7	19,066	

<b>Program</b>	Custom Lighting	<b>BES</b>	1	\$	407	1.4	3,175
	Replace 20 - 4 lamp T8 with 20 - 2 lamp 28watt T8	<b>BES</b>	1	\$	354	1.2	2,761
	Replace 4 lamp T8 with 2 lamp F28T8 and reflector.	<b>BES</b>	1	\$	673	2.2	6,501
	Replace 3 - 400 W MH with 3 - 4 lamp F28T8 fixtures	<b>BES</b>	1	\$	329	1.1	4,168
	38 - 3 lamp F32T8 fixtures retrofitted to 2 lamp F28T8	<b>BES</b>	1	\$	376	1.3	2,934
				\$	<b>3,639</b>	<b>15.9</b>	<b>38,605</b>
<b>Energy Star Appliance</b>	Energy Star Ceiling Fans	<b>BES</b>	1	\$	25	0.1	151
	Energy Star Clothes Washer	<b>BES</b>	3	\$	300	0.1	1,350
			4	\$	200	0.1	900
			5	\$	250	0.1	1,125
			6	\$	600	0.3	2,700
			7	\$	350	0.2	1,575
			8	\$	400	0.2	1,800
			9	\$	450	0.2	2,025
			11	\$	550	0.2	2,475
			14	\$	700	0.3	3,150
	Energy Star Decorative Lights	<b>BES</b>	4	\$	14	0.0	102
			13	\$	46	0.0	331
			14	\$	49	0.0	356
	Energy Star Dehumidifier	<b>BES</b>	1	\$	30	0.1	264
	Energy Star Dishwasher	<b>BES</b>	1	\$	75	0.0	411
			3	\$	150	0.0	822
			4	\$	200	0.0	1,096
			5	\$	375	0.0	2,055
			6	\$	150	0.0	822
	Energy Star Refrigerators	<b>BES</b>	1	\$	200	0.2	1,620
			2	\$	200	0.2	1,620
			3	\$	300	0.3	2,430
			4	\$	200	0.2	1,620
			5	\$	250	0.2	2,025
				\$	<b>6,064</b>	<b>2.8</b>	<b>32,825</b>
				\$	<b>150</b>	<b>0.1</b>	<b>790</b>
<b>Food Service</b>	ES Comm Solid Door Refrigerators	<b>BES</b>	1	\$	150	0.1	790
				\$	<b>150</b>	<b>0.1</b>	<b>790</b>
<b>Lighting - New Const</b>	Ltng NC_ T8 4ft Hi Bay Fixture	<b>BES</b>	24	\$	600	1.0	4,470
	Ltng NC_Low Watt T8 Fixture	<b>BES</b>	66	\$	452	1.2	4,247
				\$	<b>1,052</b>	<b>2.1</b>	<b>8,717</b>
	Ltng Retro _ CFL Fixtures & Lamps	<b>BES</b>	8	\$	12	0.4	1,171
			10	\$	15	0.4	1,640
			18	\$	27	0.8	2,951
			238	\$	357	12.8	34,852
	Ltng Retro _ Hi Perf T8 Replacing Specific Fixtures	<b>BES</b>	23	\$	690	2.3	8,488
			636	\$	18,200	60.1	245,605
	Ltng Retro _ LED & Induction Tech	<b>BES</b>	1	\$	12	0.0	166
			2	\$	48	0.1	666
			7	\$	84	0.1	1,165
			12	\$	144	0.2	1,997



			15	\$	180	0.3	2,496
			21	\$	460	0.9	4,023
			27	\$	532	1.3	4,681
	Ltng Retro _ Othr Eff Ltg Tech/Unit	BES	5	\$	100	0.3	1,068
	Ltng Retro _ Rducd Wtg Flr T8 Lamps	BES	16	\$	8	0.1	207
			76	\$	38	0.3	881
			113	\$	57	0.4	1,448
			126	\$	63	0.4	1,634
			142	\$	71	0.6	1,722
			234	\$	117	0.8	2,348
			588	\$	294	2.3	7,665
			640	\$	320	2.4	7,367
			684	\$	342	2.4	8,867
			2862	\$	1,431	12.0	48,560
	Ltng Retro _ Rducd Wtg T8 CEE Qual	BES	6	\$	42	0.1	430
			12	\$	108	0.3	1,235
			18	\$	261	0.8	3,112
			153	\$	1,692	5.0	12,002
	Ltng Retro _ T5HO Hi Bay Fix w-Elec Bal	BES	24	\$	2,160	5.5	20,132
	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	2	\$	140	0.4	960
			4	\$	340	0.9	2,835
			10	\$	700	1.5	5,376
			12	\$	1,020	2.7	6,400
			16	\$	1,360	3.5	11,339
			17	\$	1,445	3.8	9,378
			61	\$	5,185	13.7	32,533
	Ltng Retro _Flrscnt T8 & T5 w/Elec Bal	BES	8	\$	193	0.5	2,291
			12	\$	300	1.0	3,166
			43	\$	1,005	2.7	11,982
			58	\$	1,450	3.9	16,202
			68	\$	1,399	4.3	15,921
			115	\$	2,875	9.3	44,683
			153	\$	2,545	7.3	26,618
			204	\$	2,857	7.5	29,320
			318	\$	6,256	17.4	76,483
			338	\$	6,510	19.0	67,334
	Ltng Retro_CFL Reflector Flood	BES	21	\$	168	2.5	8,808
			43	\$	344	5.5	17,138
			831	\$	3,324	58.2	155,646
	Ltng Retro_Low Watt T8 Fixture	BES	4	\$	36	0.1	407
			35	\$	253	0.9	2,501
			169	\$	1,836	7.0	19,115
	Ltng Retro_Rducd Wtg T8 Fixture	BES	11	\$	99	0.4	1,022
			15	\$	180	0.6	1,647
			147	\$	1,656	5.3	19,366
			255	\$	1,988	7.2	28,376
				\$	73,329	300.9	1,045,426
Res HVAC	Air Handler _ Fan Coil with ECM	BES	1	\$	450	0.7	1,200
			2	\$	300	0.5	800
			4	\$	600	0.9	1,600

		HVAC Air_Source HP	BES	1	\$	500	0.8	3,962
				2	\$	1,500	2.4	11,886
				3	\$	750	1.2	5,943
		HVAC Central AC unit	BES	1	\$	100	0.2	154
				2	\$	800	2.2	1,556
				3	\$	900	2.7	1,918
				4	\$	400	0.8	546
		HVAC HE Furnace with ECM	BES	1	\$	300	0.5	800
				2	\$	600	0.9	1,600
				3	\$	900	1.4	2,400
				4	\$	600	0.9	1,600
				5	\$	750	1.2	2,000
				10	\$	1,500	2.3	4,000
		HVAC Mini Split_Ductless Air_Source HP	BES	1	\$	400	0.9	12,940
				2	\$	400	0.9	12,940
		Programmable Thermostat - AC Only	BES	1	\$	50	0.0	374
				2	\$	50	0.0	374
		Programmable Thermostat - Elec Heat w/AC	BES	1	\$	50	0.0	4,544
		Programmable Thermostat - Heat Pump	BES	1	\$	75	0.0	3,342
				3	\$	75	0.0	3,342
				4	\$	100	0.0	4,456
		Programmable Thermostat - NON Elec-Gas w/AC	BES	1	\$	50	0.0	374
				2	\$	50	0.0	374
				3	\$	225	0.0	1,683
				4	\$	100	0.0	748
				7	\$	175	0.0	1,309
				8	\$	200	0.0	1,496
					\$	12,950	21.2	90,261
Specialty Measures		Energy Star Clothes Washer	BES	1	\$	50	0.0	225
					\$	50	0.0	225
VFDs and Pumps		Variable Freq Drives	BES	2	\$	240	1.0	2,759
					\$	240	1.0	2,759
Res Lighting		CFL Fixtures and Lamps	BES	415	\$	623	1.7	16,113
					\$	623	1.7	16,113
<b>2011 Total</b>					\$	98,445	348.0	1,241,475
2012	CI HVAC	ECM in Res Style Furnace	BES	6	\$	900	1.4	2,400
		Setback Thermostats	BES	4	\$	200	1.3	3,288
		Setback/Programmable Thermostats	BES	6	\$	300	0.0	5,292
		Unitary Air Cooled Split System AC	BES	2	\$	2,500	9.7	4,128
		Unitary Single Pkgd AC	BES	3	\$	1,560	7.3	7,074
					\$	5,460	19.7	22,182
	Custom Electric Program	Custom Lighting	BES	1	\$	2,546	8.5	30,669
		Geothermal - large system new construction	BES	1	\$	11,484	27.9	311,402
		Replace 6 - 4 lamp F32T8 with 6 - 2 lamp F28T8 Nema Premium.	BES	1	\$	106	0.4	920
					\$	14,136	36.7	342,991
Energy Star Appliance		Energy Star Clothes Washer	BES	1	\$	50	0.0	225

			4	\$	600	0.3	2,700
			5	\$	250	0.1	1,125
			6	\$	1,200	0.5	5,400
			8	\$	400	0.2	1,800
			10	\$	500	0.2	2,250
			15	\$	750	0.3	3,375
	Energy Star Decorative Lights	BES	10	\$	35	0.0	255
	Energy Star Dehumidifier	BES	1	\$	10	0.0	88
			3	\$	30	0.1	264
	Energy Star Dishwasher	BES	1	\$	25	0.0	137
			2	\$	100	0.0	548
			3	\$	225	0.0	1,233
			4	\$	300	0.0	1,644
			5	\$	125	0.0	685
			6	\$	300	0.0	1,644
	Energy Star Refrigerators	BES	1	\$	150	0.1	1,215
			2	\$	200	0.2	1,620
			3	\$	150	0.1	1,215
			4	\$	400	0.4	3,240
	Energy Star Room AC	BES	1	\$	15	0.1	50
			2	\$	30	0.2	100
				\$	5,845	2.8	30,813
Food Service	ES Ice Machines	BES	1	\$	300	0.3	2,695
				\$	300	0.3	2,695
Lighting - New Const	Ltng NC _ T8 4ft Hi Bay Fixture	BES	24	\$	1,200	4.6	25,751
			171	\$	6,600	19.4	63,177
	Ltng NC _ T8 4ft Hi Performance	BES	183	\$	750	3.1	8,357
				\$	8,550	27.1	97,285
Lighting - Retrofit	Ltng Retro _ CFL Fixtures & Lamps	BES	12	\$	18	0.5	1,967
	Ltng Retro _ CFL Reflector Flood	BES	26	\$	104	1.5	5,452
			31	\$	124	1.8	6,501
	Ltng Retro _ Flrsct T8 & T5 w/Elec Bal	BES	15	\$	270	0.8	2,715
			24	\$	242	0.6	1,800
			29	\$	474	1.2	5,103
			59	\$	589	1.5	5,977
			96	\$	2,400	6.4	28,359
			125	\$	1,502	4.1	15,378
			126	\$	1,610	4.1	15,489
	Ltng Retro _ Hi Perf T8 Replacing Specific Fixtures	BES	6	\$	180	0.6	1,635
	Ltng Retro _ LED & Induction Tech	BES	1	\$	12	0.0	166
			3	\$	36	0.1	499
			5	\$	120	0.2	1,664
			13	\$	156	0.2	2,164
			80	\$	1,200	4.4	12,042
			144	\$	2,160	8.0	21,675
	Ltng Retro _ Rducd Wtg Flr T8 and T5HO Lamps	BES	46	\$	23	0.2	596
			192	\$	96	0.7	2,489
	Ltng Retro _ Rducd Wtg Flr T8 Lamps	BES	176	\$	88	0.8	2,038
	Ltng Retro _ Rducd Wtg T8 CEE Qual	BES	7	\$	63	0.2	721

			51	\$	792	2.6	9,482	
			104	\$	1,872	6.1	22,603	
	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	3	\$	255	0.9	2,360	
			25	\$	1,885	4.8	14,799	
			29	\$	2,465	6.5	17,045	
	Ltng Retro _Flrsct T8 & T5 w/Elec Bal	BES	88	\$	2,088	6.8	22,188	
	Ltng Retro_Rducd Wtg T8 Fixture	BES	64	\$	981	3.7	10,094	
				\$	21,805	69.3	233,001	
Res HVAC	Air Handler _ Fan Coil with ECM	BES	1	\$	450	0.7	1,200	
	HVAC Air_Source HP	BES	2	\$	500	0.8	3,962	
	HVAC Air_Source HP - 14.5 SEER	BES	1	\$	750	0.6	4,743	
	HVAC Central AC unit	BES	1	\$	500	3.0	1,748	
			2	\$	600	2.9	1,792	
			3	\$	300	2.1	1,149	
	HVAC HE Furnace with ECM	BES	1	\$	300	0.5	800	
			2	\$	1,200	1.8	3,200	
			3	\$	1,350	2.1	3,600	
			4	\$	600	0.9	1,600	
	Programmable Thermostat - Elec Heat w/AC	BES	1	\$	25	0.1	2,272	
			3	\$	75	0.0	6,816	
	Programmable Thermostat - Heat Pump	BES	1	\$	75	0.0	3,342	
	Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	BES	1	\$	125	0.2	935	
			2	\$	150	0.4	1,122	
			3	\$	150	0.3	1,122	
			4	\$	100	0.2	748	
				\$	7,250	16.6	40,151	
	VFDs and Pumps	Variable Freq Drives	BES	2	\$	400	2.6	7,137
				\$	400	2.6	7,137	
Res Lighting	CFL Fixtures and Lamps	BES	108	\$	162	0.4	4,193	
			\$	162	0.4	4,193		
2012 Total				\$	63,908	175.5	780,448	
2013	CI HVAC	ECM in Res Style Furnace	BES	1	\$	150	0.2	400
		Mini Split Ductless Air Source HP	BES	1	\$	400	0.9	12,940
		Setback/Programmable Thermostats	BES	2	\$	100	0.0	6,544
				\$	650	1.1	19,884	
	Custom Electric Program	Custom Lighting	BES	1	\$	2,829	9.6	28,582
				\$	2,829	9.6	28,582	
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$	50	0.0	131
				3	\$	150	0.1	393
				6	\$	1,200	0.4	3,144
				7	\$	350	0.1	917
				8	\$	800	0.3	2,096
				9	\$	450	0.2	1,179
				10	\$	500	0.2	1,310
				15	\$	750	0.3	1,965
		Energy Star Decorative Lights	BES	7	\$	25	0.0	547
		Energy Star Dehumidifier	BES	1	\$	10	0.1	90
			2	\$	20	0.2	180	

Lighting - New Const	Energy Star Dishwasher	BES	1	\$	50	0.1	120
			2	\$	200	0.3	480
			3	\$	75	0.1	180
			4	\$	100	0.1	240
			5	\$	375	0.6	900
	Energy Star Refrigerators	BES	7	\$	175	0.3	420
			1	\$	300	0.3	2,430
			2	\$	200	0.2	1,620
			4	\$	600	0.6	4,860
			5	\$	250	0.2	2,025
	Energy Star Room AC	BES	1	\$	15	0.1	50
				\$	<b>6,645</b>	<b>4.5</b>	<b>25,277</b>
	CEE Qual T8 4ft Low Wattage System	BES	21	\$	189	0.5	1,196
	Hi Bay Occupancy Sensor Control	BES	16	\$	160	0.7	3,851
	LED Energy Star Recessed Downlight	BES	24	\$	600	1.3	4,786
	T8 4ft Hi Bay Fixture	BES	2	\$	100	0.3	711
			6	\$	300	0.9	2,235
			17	\$	850	3.4	7,030
			20	\$	1,000	3.9	10,625
			72	\$	3,175	12.4	33,735
Lighting - Retrofit				\$	<b>6,374</b>	<b>23.4</b>	<b>64,169</b>
	LED & Induction Tech	BES	1	\$	12	0.0	150
			3	\$	36	0.1	499
			34	\$	525	1.0	5,956
			35	\$	525	1.7	5,825
			47	\$	955	2.9	7,764
			165	\$	2,535	9.1	25,129
	Othr Eff Ltg Tech - per Unit	BES	677	\$	10,155	37.5	101,903
			3	\$	60	0.2	717
			5	\$	100	0.3	1,195
	Rduc'd Wtg T8 Lamps ONLY	BES	2	\$	2	0.0	26
			36	\$	36	0.1	467
			64	\$	64	0.2	830
			460	\$	460	2.0	5,326
			576	\$	576	2.3	7,468
			1080	\$	1,080	3.2	8,478
	Reduced Wtg T8 4ft CEE Qual	BES	1542	\$	1,542	4.7	12,626
			3	\$	27	0.1	309
			28	\$	252	0.8	2,883
			66	\$	792	3.1	8,316
			84	\$	736	2.3	8,381
	T8 4ft w/ Bal and Reflectors	BES	245	\$	4,392	13.5	33,040
			2	\$	100	0.3	1,305
			11	\$	240	0.7	2,888
			26	\$	650	2.1	6,860
			32	\$	800	2.1	9,453
			44	\$	1,100	2.9	12,998
	T8 4ft w/Elec Bal	BES	58	\$	1,359	3.8	15,974
			288	\$	7,200	21.1	80,912
			3	\$	18	0.0	96

			12	\$	72	0.2	641
			24	\$	457	1.3	4,037
			26	\$	268	0.8	3,008
			36	\$	223	0.5	1,990
			98	\$	1,211	3.1	11,339
	CFL Fixtures and Lamps	BES	10	\$	40	0.7	1,873
			21	\$	84	1.4	5,328
	T8 Hi Bay Fixtures w/ 4ft Lamps	BES	4	\$	340	1.2	3,147
			9	\$	765	2.0	4,965
				\$	<b>39,789</b>	<b>129.3</b>	<b>404,102</b>
Res HVAC	Air Handler _ Fan Coil with ECM	BES	1	\$	450	0.7	1,200
			2	\$	300	0.5	800
	HVAC Air_Source HP - 14.5 SEER	BES	1	\$	500	0.4	3,162
			2	\$	1,000	0.8	6,324
			3	\$	750	0.6	4,743
	HVAC Central AC unit	BES	1	\$	200	1.2	642
			2	\$	400	3.2	1,746
			5	\$	500	4.0	2,181
			9	\$	900	7.5	4,085
			10	\$	1,000	7.9	4,311
			11	\$	2,200	18.7	10,214
			12	\$	1,200	9.8	5,359
	HVAC HE Furnace with ECM	BES	1	\$	300	0.5	800
			2	\$	600	0.9	1,600
			3	\$	900	1.4	2,400
			6	\$	900	1.4	2,400
			11	\$	3,300	5.1	8,800
			13	\$	1,950	3.0	5,200
			14	\$	4,200	6.4	11,200
	HVAC Mini Split_Ductless Air_Source HP	BES	1	\$	200	0.4	6,470
	Programmable Thermostat - Heat Pump	BES	1	\$	50	0.2	2,228
			2	\$	50	0.2	2,228
			3	\$	150	0.6	6,684
	Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	BES	2	\$	100	0.4	748
			3	\$	75	0.3	561
			4	\$	200	0.8	1,496
			10	\$	250	1.0	1,870
			11	\$	275	1.1	2,057
			12	\$	600	2.3	4,488
			13	\$	325	1.3	2,431
				\$	<b>23,825</b>	<b>82.4</b>	<b>108,428</b>
Res Lighting	CFL Fixtures and Lamps	BES	142	\$	213	0.7	6,219
				\$	<b>213</b>	<b>0.7</b>	<b>6,219</b>
Comm Refrigeration	Anti_sweat heater control	BES	1	\$	180	0.2	9,156
	ECM Fan Motor for Cooler-Freezer	BES	15	\$	660	1.6	18,489
				\$	<b>840</b>	<b>1.7</b>	<b>27,645</b>
2013 Total				\$	<b>81,164</b>	<b>252.7</b>	<b>684,306</b>
Grand Total				\$	<b>363,278</b>	<b>1,052.0</b>	<b>3,863,562</b>

## Appendix 2 – Pierre Resolution

### RESOLUTION NO. 2526

- WHEREAS,** the City of Pierre purchases a significant portion of its power supply from the Western Area Power Administration (Western); and
- WHEREAS,** Western has recently published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing of an Integrated Resource Plan (IRP); and
- WHEREAS,** the municipal utility staff has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and
- WHEREAS,** our customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and
- WHEREAS,** any public comments received have been addresses in order to strengthen the city's Integrated Resource Plan; and
- WHEREAS,** the IRP Summary Report included 5-year and 2-year action plans outlining actions to be taken by the Municipal utility during the next several years
- NOW THEREFORE BE IT RESOLVED BY** the City of Pierre City Commission as follows:

That the "Integrated Resource Plan Summary Report for the City of Pierre shall be approved for filing with Western under the Energy Planning and Management Program."

Passed and approved this 12<sup>th</sup> day of August, 2014.

(SEAL)

  
Laurie R. Gill, Mayor

ATTEST:

  
Twila Hight, Finance Officer

## **VII. Vermillion, SD Resource Planning**

### **A. *City Information***

Vermillion, located in Clay County, is a community of more than 10,500 individuals located in southeastern South Dakota. Municipal services include electricity, water, and sewer services. The City is the home of the University of South Dakota. The City has many large employers. The three largest are the University of South Dakota (800 employees) and Sanford Health (233 employees). Other major employers (each employing between 100 and 160 people) include Hy-Vee, Polaris Industries, Vermillion City, Vermillion School District, and Wal-Mart.

In 2013, the municipal utility had 3,972 residential customers, and 497 commercial customers. The residential sector's yearly usage averaged 7,962 kWh per customer in 2012, and commercial customers averaged 68,785 kWh.

The rates for each type of customer are shown on the rate sheet on Exhibit 1. Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4, which show the winter and summer peak demand and energy for the seasons 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Vermillion on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 11,218 kW in the winter and 16,562 kW in the summer.

Exhibits 7 and 8 each shows the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load decreasing from midnight to roughly 5 am and then increasing till 9 am. The load then begins to level off until a brief upswing at 6 pm followed by a steady decline until 5 am the next day. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline occurs until 6 am the next day.



## Exhibit 1

### VERMILLION, SOUTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$9.00
	\$/kWh Jun-Aug	\$.098
	\$/kWh Sep-May	\$.089
Small Commercial - Single Phase	Customer Charge	\$15.00
	\$/kWh Jun-Aug	\$.098
	\$/kWh Sep-May	\$.093
Small Commercial - Three Phase	Customer Charge	\$25.00
	\$/kWh Jun-Aug	\$.098
	\$/kWh Sep-May	\$.093
Large Commercial	Customer Charge	\$33.00
	\$/kW Jun-Aug	\$13.30
	\$/kW Sep-May	\$11.30
	\$/kWh	\$.039

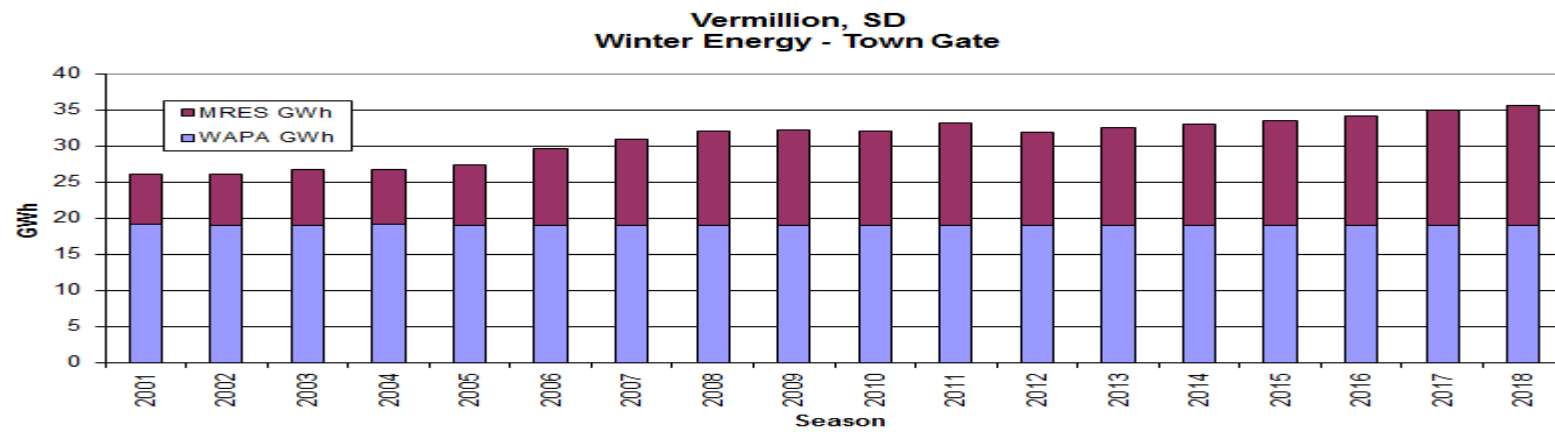
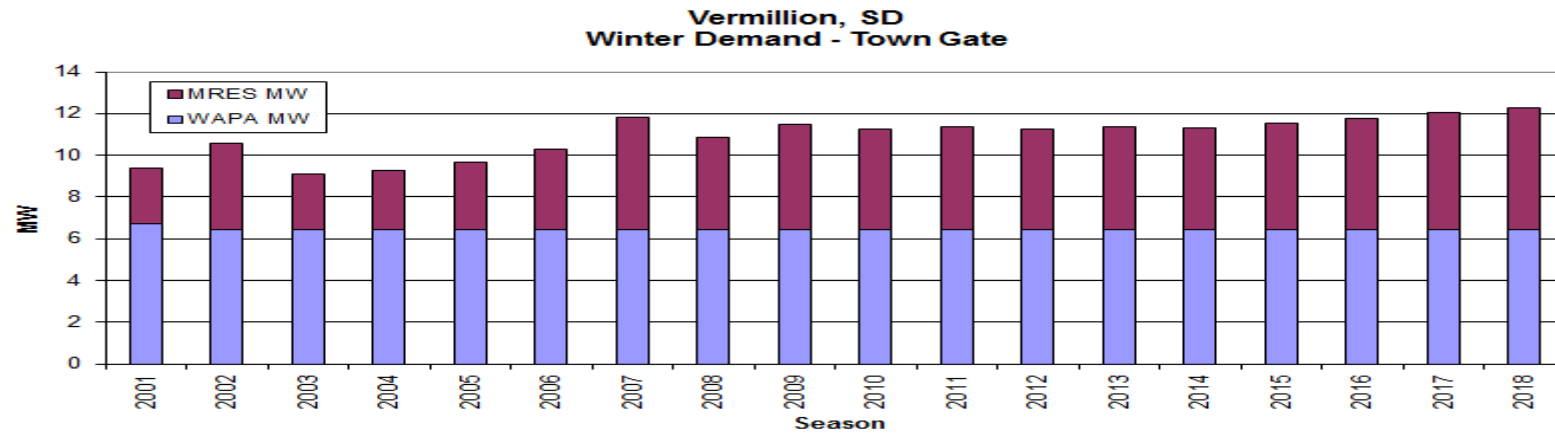
## Exhibit 2

MRES Seasonal Load Report  
 Vermillion, SD  
 Town Gate Load  
 BASE Forecast

1/31/14 2:14 PM  
 Town Gate Load  
 Monthly Splits  
 Historic Through 12/2013

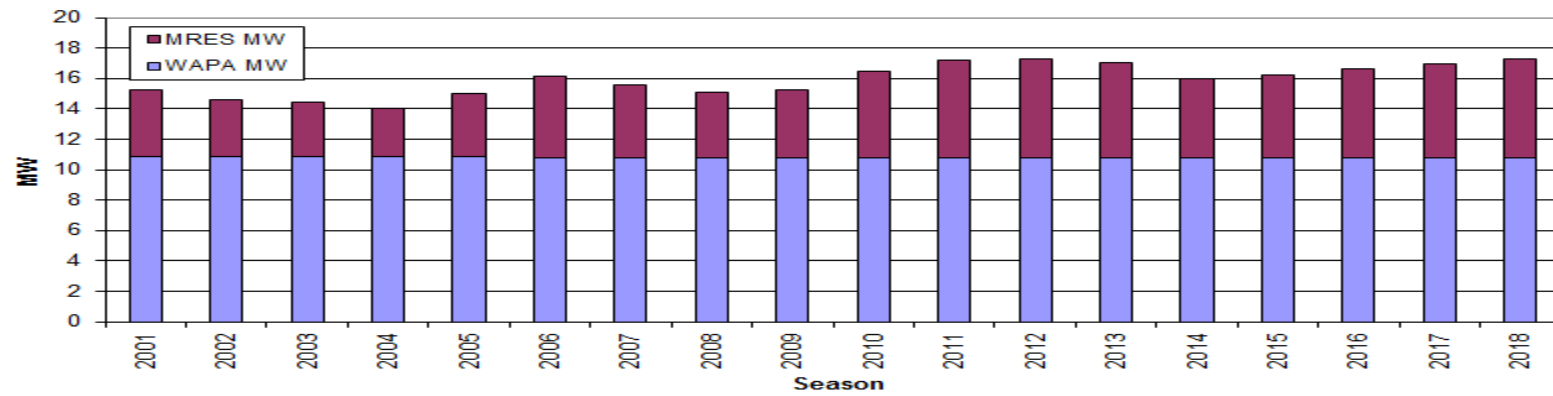
Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	14,745	10,814	4,421	0	2001	30,191,469	23,108,000	7,083,469	0
2002	14,288	10,814	3,744	0	2002	32,425,643	23,108,000	9,317,643	0
2003	13,964	10,814	3,640	0	2003	30,577,524	23,108,000	7,469,524	0
2004	13,995	10,814	3,213	0	2004	30,168,255	23,108,000	7,060,255	0
2005	14,533	10,814	4,209	0	2005	34,211,154	23,108,000	11,103,154	0
2006	16,132	10,796	5,336	0	2006	35,071,534	23,071,000	12,000,534	0
2007	15,424	10,796	4,811	0	2007	36,243,138	23,071,000	13,172,138	0
2008	14,746	10,796	4,273	0	2008	34,110,666	23,071,000	11,039,666	0
2009	14,776	10,796	4,469	0	2009	32,871,257	23,071,000	9,800,257	0
2010	15,619	10,796	5,687	0	2010	36,220,691	23,071,000	13,149,691	0
2011	16,720	10,796	6,413	0	2011	36,731,820	23,071,000	13,660,820	0
2012	17,114	10,796	6,486	0	2012	38,438,173	23,071,000	15,367,173	0
2013	16,562	10,796	6,255	0	2013	36,069,679	23,071,000	12,998,679	0
2014	15,456	10,796	5,149	0	2014	35,592,504	23,071,000	12,521,504	0
2015	15,758	10,796	5,451	0	2015	36,288,098	23,071,000	13,217,098	0
2016	16,125	10,796	5,818	0	2016	37,134,289	23,071,000	14,063,289	0
2017	16,464	10,796	6,157	0	2017	37,914,698	23,071,000	14,843,698	0
2018	16,796	10,796	6,489	0	2018	38,679,128	23,071,000	15,608,128	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	10,006	6,444	4,127	0	2002	26,050,837	18,918,000	7,132,837	0
2003	8,803	6,444	2,654	0	2003	26,712,993	18,918,000	7,794,993	0
2004	9,125	6,444	2,801	0	2004	26,761,861	19,038,000	7,723,861	0
2005	9,554	6,444	3,230	0	2005	27,357,439	18,918,000	8,439,439	0
2006	10,305	6,444	3,861	0	2006	29,528,087	18,892,000	10,636,087	0
2007	11,265	6,430	5,399	0	2007	30,948,004	18,878,000	12,070,004	0
2008	10,714	6,430	4,404	0	2008	31,983,696	18,998,000	12,985,696	0
2009	11,496	6,430	5,066	0	2009	32,137,630	18,878,000	13,259,630	0
2010	11,148	6,430	4,838	0	2010	32,095,175	18,878,000	13,217,175	0
2011	11,240	6,430	4,930	0	2011	33,119,499	18,878,000	14,241,499	0
2012	10,855	6,430	4,812	0	2012	31,840,775	18,998,000	12,842,775	0
2013	11,218	6,430	4,908	0	2013	32,541,069	18,878,000	13,663,069	0
2014	11,177	6,430	4,867	0	2014	32,995,807	18,878,000	14,117,807	0
2015	11,395	6,430	5,085	0	2015	33,397,472	18,878,000	14,519,472	0
2016	11,661	6,430	5,351	0	2016	34,133,700	18,997,750	15,135,950	0
2017	11,906	6,430	5,596	0	2017	34,877,514	18,878,000	15,999,514	0
2018	12,146	6,430	5,836	0	2018	35,590,752	18,878,000	16,712,752	0

### Exhibit 3

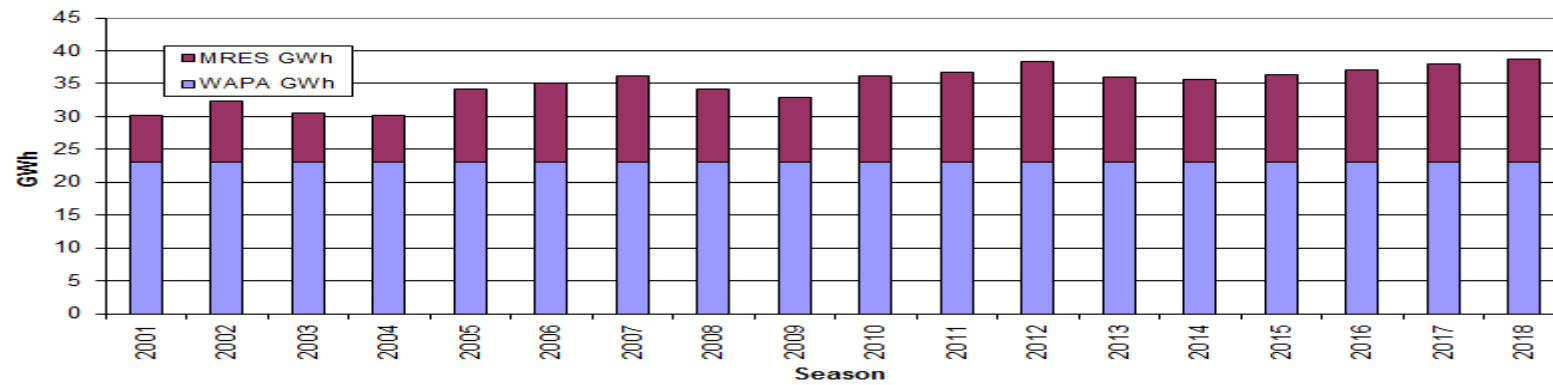


## Exhibit 4

Vermillion, SD  
Summer Demand - Town Gate

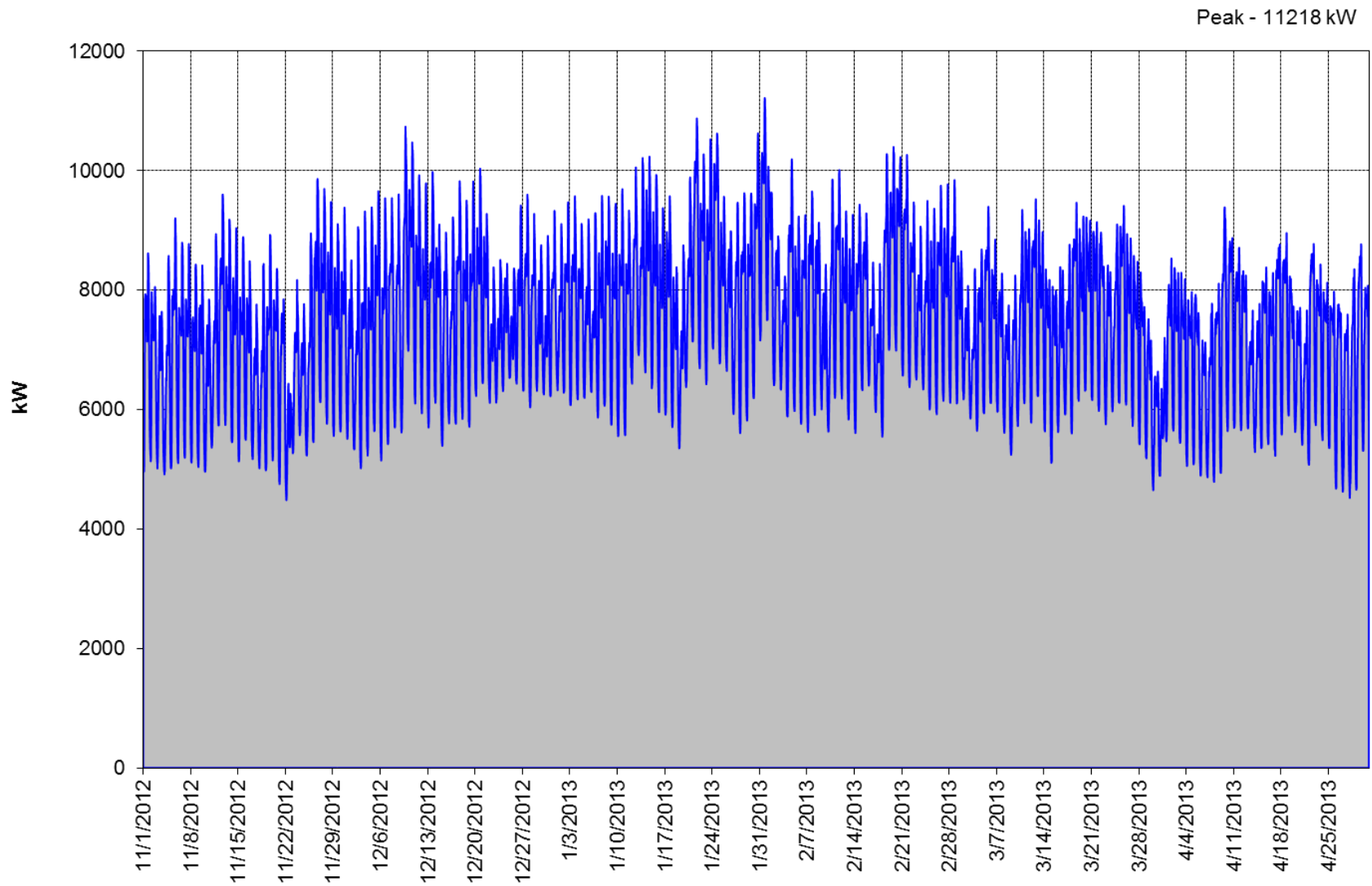


Vermillion, SD  
Summer Energy - Town Gate



## Exhibit 5

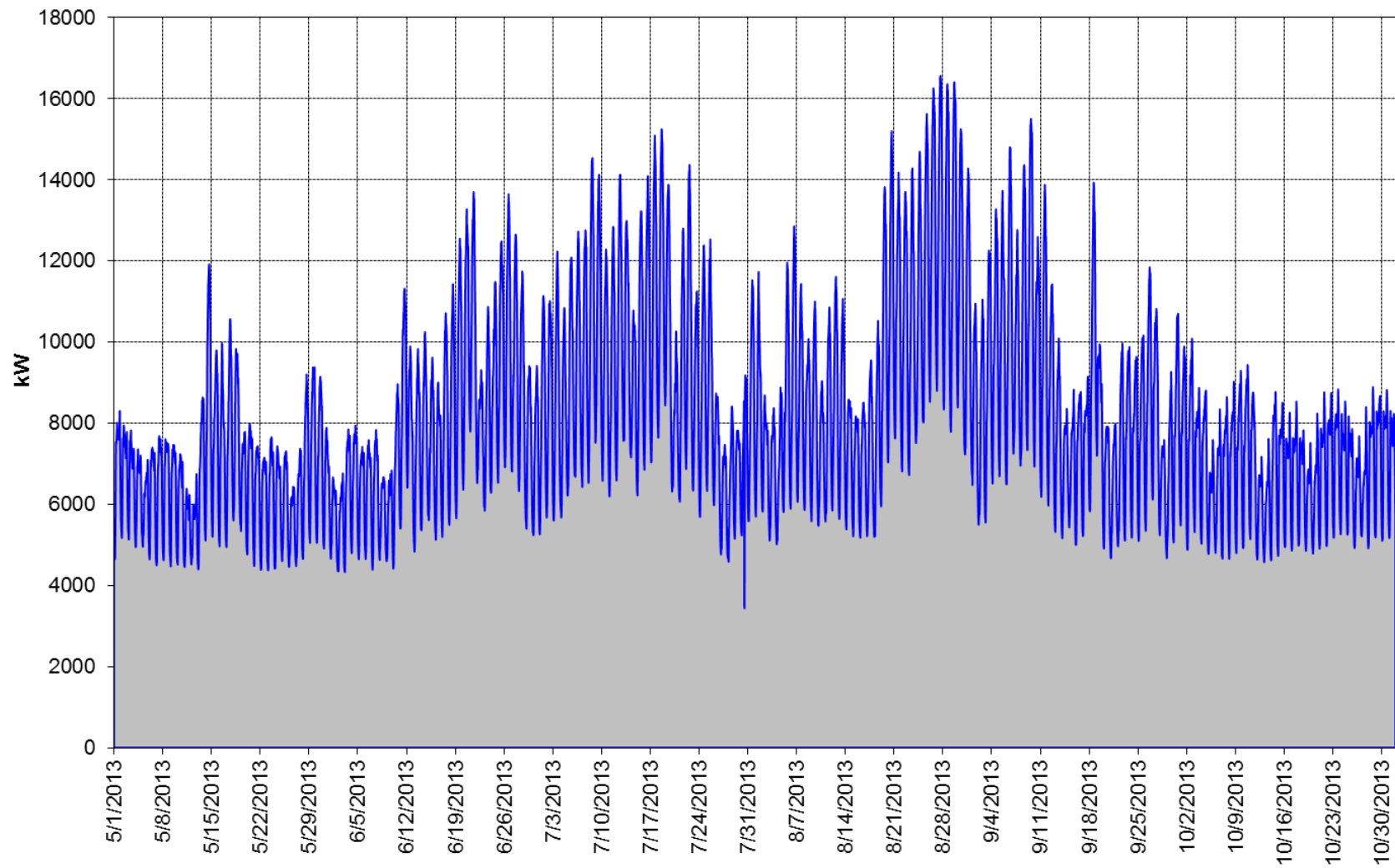
### Vermillion, SD Winter 2012-2013 Half-Hour Load Shape - Town Gate



## Exhibit 6

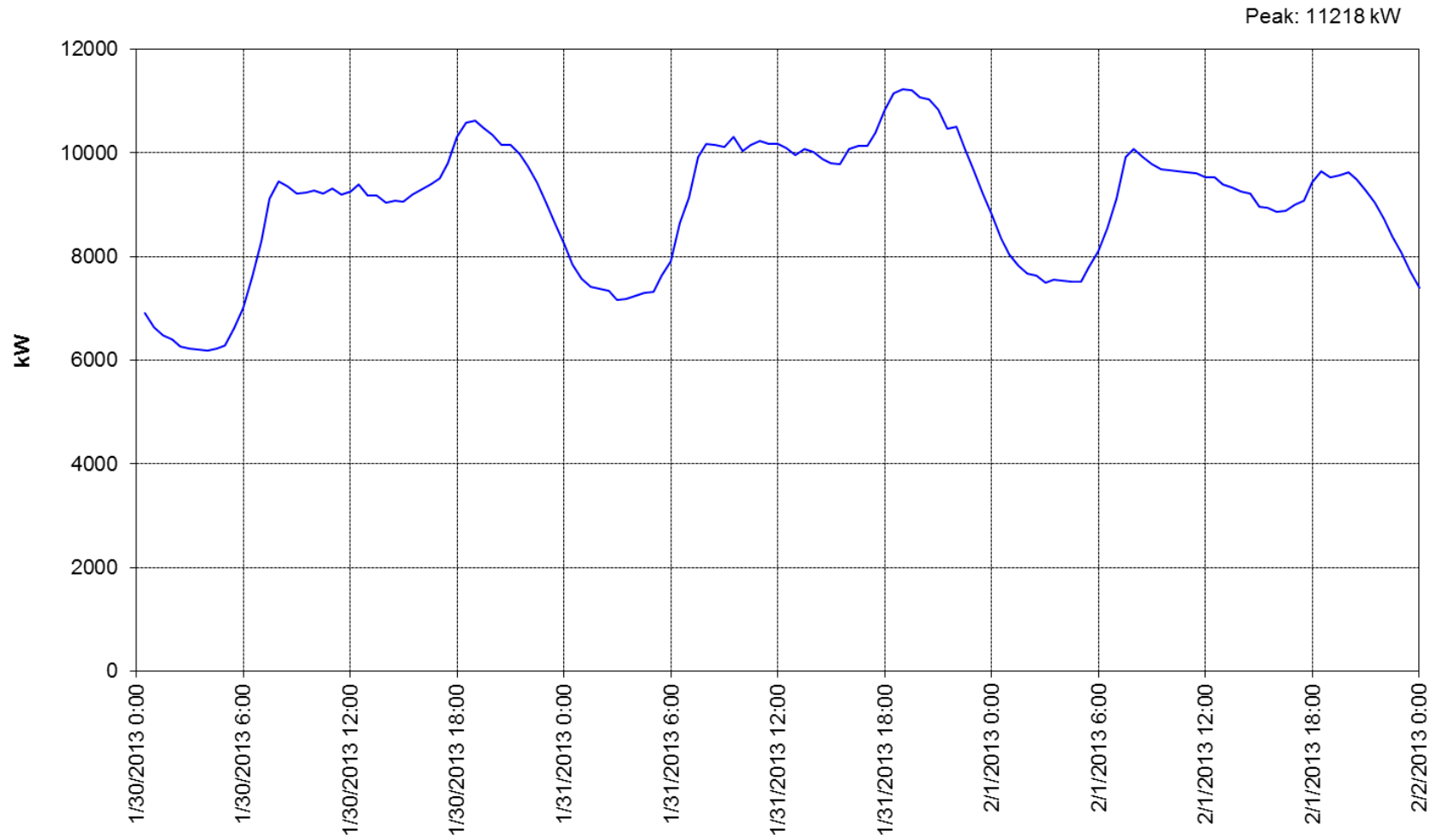
### Vermillion, SD Summer 2013 Half-Hour Load Shape - Town Gate

Peak - 16562 kW



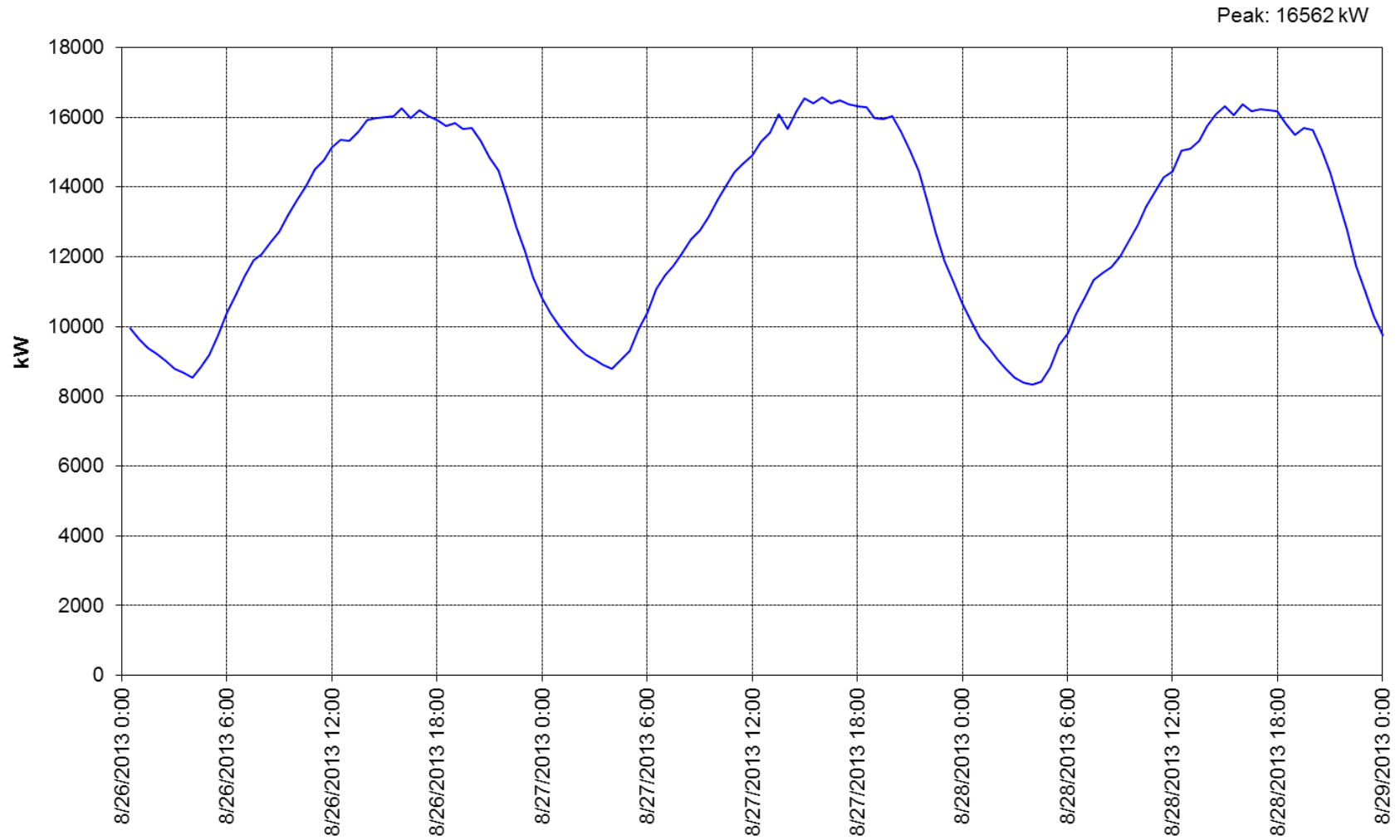
## Exhibit 7

Vermillion, SD Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate



## Exhibit 8

Vermillion, SD Peak Half-Hour Load Shape, Summer 2013, Town Gate





## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Vermillion is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Vermillion to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Vermillion has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2009	Cooling	BES	1	\$ 323	0.7	2,700
	Cooling/Chiller	BES	3	\$ 150	5.1	28,404
	Custom Lighting	BES	1	\$ 6,074	20.2	84,223
	Energy Star Appliance	BES	10	\$ 1,596	2.8	5,479
	Lighting	BES	839	\$ 40,784	84.9	430,337
	Lighting - New Const	BES	178	\$ 2,392	20.4	77,931
	Motors	BES	1	\$ 750	0.1	398
	Res HVAC	BES	21	\$ 7,700	14.2	23,708
	VFDs and Pumps	BES	1		3.4	12,403
	Res Lighting	BES	460	\$ 660	1.8	23,000
<b>2009 Total</b>			<b>1515</b>	<b>\$ 60,428</b>	<b>153.5</b>	<b>688,583</b>
2010	CI HVAC	BES	12	\$ 5,340	9.9	55,350
	Energy Star Appliance	BES	88	\$ 1,221	0.4	5,463
	Lighting - New Const	BES	14	\$ 840	3.0	7,489
	Lighting - Retrofit	BES	685	\$ 15,929	43.8	211,396
	Res HVAC	BES	65	\$ 8,100	16.7	20,475
<b>2010 Total</b>			<b>864</b>	<b>\$ 31,430</b>	<b>73.9</b>	<b>300,173</b>
2011	CI HVAC	BES	10	\$ 1,250	4.2	18,362
	Energy Star Appliance	BES	25	\$ 539	0.5	3,256
	Lighting - Retrofit	BES	148	\$ 1,978	4.4	30,421
	Res HVAC	BES	53	\$ 4,275	7.1	13,753
	VFDs and Pumps	BES	4	\$ 4,000	26.0	105,742
	Res Lighting	BES	5236	\$ 7,854	20.9	203,298
<b>2011 Total</b>			<b>5476</b>	<b>\$ 19,896</b>	<b>63.2</b>	<b>374,832</b>
2012	CI HVAC	BES	5	\$ 689	2.4	9,896
	Energy Star Appliance	BES	20	\$ 550	0.2	2,868
	Lighting - Retrofit	BES	284	\$ 3,159	9.2	43,249
	Res HVAC	BES	57	\$ 5,550	18.7	22,274
<b>2012 Total</b>			<b>366</b>	<b>\$ 9,948</b>	<b>30.5</b>	<b>78,287</b>
2013	CI HVAC	BES	21	\$ 2,125	3.2	15,825
	Energy Star Appliance	BES	18	\$ 410	0.5	2,506
	Food Service	BES	8	\$ 1,140	1.4	11,893
	Lighting - New Const	BES	319	\$ 16,241	50.9	310,188
	Lighting - Retrofit	BES	493	\$ 7,280	26.3	96,025
	Res HVAC	BES	71	\$ 8,000	28.1	43,639
<b>2013 Total</b>			<b>930</b>	<b>\$ 35,196</b>	<b>110.3</b>	<b>480,076</b>
<b>Grand Total</b>			<b>9151</b>	<b>\$ 156,896</b>	<b>431.5</b>	<b>1,921,951</b>

- **Load Management Program**

Description: Vermillion Municipal Utilities operates load management switches on 2,236 central AC units (including residential, commercial, industrial, and municipal AC units), 203 electric water heaters (load management switches are mandatory on all water heaters by city ordinance), and five humidifiers in city buildings. Additional load management measures include voltage control during peak times and manually shutting down all non-essential operations at the city water plant while the load management system is in operation. The city continues to invest in the system by purchasing new hardware and software as necessary, and tests 25% of all control devices annually for proper operation.

Energy Savings: Approximately 3.5 MW on peak

Cost: Approximate annual average of \$42,000

#### ***D. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Vermillion was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

#### ***E. Options Chosen – Development of Action Plan***

DSMware software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or is planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

##### ***i. Future Actions***

It is assumed that Vermillion will continue to participate in the Bright Energy Solutions program. Vermillion would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Vermillion will participate in all of the Bright Energy Solutions programs to the extent possible. This assumption was made only to obtain more realistic expectations for the five-year plan, and is certainly not considered to be a cap on participation in the event that the program attracts more participants than anticipated.

Representatives from Vermillion plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, Vermillion is successfully operating their own Load Management program, and it is unknown if they will participate in the MRES Coordinated Demand Response (CDR) program in the future. That decision will be evaluated in years to come.

## ***ii. Milestones***

As part of the annual WAPA IRP updates, Vermillion will evaluate the progress on these programs. The success will be measured against this 5-year plan, with adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

## ***E. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

***F. Public Participation***

A preliminary draft of this report was produced on June 1, 2014. A notice of public hearing on IRP was published in the local newspaper on June 2, 2014. The public hearing on the IRP was held at the June 16, 2014 City Council meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The City Council approved the resolution on June 16, 2014. A copy of the approved resolution is included in Appendix 2.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b>5/18/2014</b>
	<b>5/30/2014 and 6/6/2014</b>
Date Published in Paper	<b>6/6/2014</b>
Public Hearing Date	<b>6/16/2014</b>
Date Approved by City Council	<b>6/16/2014</b>

## Appendix 1 – Detailed DSM Measures Installed

Utility Vermillion

Year	Program	Measure	BES or City	Quan	Incentive	kW	kWh
2009	Cooling	Chilled water reset 53.8 tons	BES	1	\$ 323	0.7	2,700
					<b>\$ 323</b>	<b>0.7</b>	<b>2,700</b>
	Cooling/Chiller	Program. Thermostat	BES	3	\$ 150	5.1	28,404
					<b>\$ 150</b>	<b>5.1</b>	<b>28,404</b>
	Custom Lighting	Controls	BES	1	\$ 6,074	20.2	84,223
					<b>\$ 6,074</b>	<b>20.2</b>	<b>84,223</b>
	Energy Star Appliance	580.54351	BES	1	\$ 10	0.1	92
		DU1345XTVB0	BES	1	\$ 25	0.0	144
		FDF50S1	BES	1	\$ 10	0.1	92
		FDR25S1	BES	1	\$ 20	0.1	184
		Kenmore 48102701	BES	1	\$ 50	0.0	165
		Kenmore Elite	BES	1	\$ 25	0.0	144
		Maytag MVWC6ESWW1	BES	1	\$ 50	0.0	165
		Samsung WF219AN	BES	1	\$ 50	0.0	165
		WF448AAP	BES	1	\$ 50	0.0	165
		(blank)	BES	(blank)	\$ 1,306	2.3	4,163
					<b>\$ 1,596</b>	<b>2.8</b>	<b>5,479</b>
	Lighting	85W CFLs	BES	1		6.2	93,228
		LED exit sign	BES	7		0.2	1,162
		Occup. Sensors	BES	17	\$ 340	1.2	4,675
		T12 4' 2L	BES	3	\$ 141	0.0	165
		T12 4' 4L	BES	3		0.1	378
		T8 4' 4L	BES	155	\$ 39,755	5.1	19,530
		T8 HB 6L	BES	444		65.3	285,492
		CFL Fixtures and Lamps	BES	209	\$ 548	6.7	25,707
					<b>\$ 40,784</b>	<b>84.9</b>	<b>430,337</b>
	Lighting - New Const	Occup. Sensors	BES	47		3.4	12,925
		Switching controls	BES	1		0.8	2,231
		T8 HB 6L	BES	15	\$ 2,392	2.2	9,645
		CFL Fixtures and Lamps	BES	115		14.0	53,130
	Motors	15HP motor	BES	1	\$ 750	0.1	398
					<b>\$ 750</b>	<b>0.1</b>	<b>398</b>
	Res HVAC	14.5 SEER AC	BES	1	\$ 500	0.2	84
		15 SEER AC	BES	1		0.5	312
		16 SEER AC	BES	1		0.3	180
		16.6 SEER AC	BES	1	\$ 100	0.2	90
		17 SEER AC	BES	1		0.2	90
		18.7 SEER AC	BES	1		0.2	90
		ECM-gas furnace	BES	1	\$ 2,000	1.6	8,110
		(blank)	BES	(blank)	\$ 5,100	11.0	14,752
					<b>\$ 7,700</b>	<b>14.2</b>	<b>23,708</b>

VFDs and Pumps		15HP VFD	BES	1		3.4	12,403	
						3.4	12,403	
Res Lighting		460 CFL bulbs	BES	460	\$ 660	1.8	23,000	
					\$ 660	1.8	23,000	
2009 Total					\$ 60,428	153.5	688,583	
2010	CI HVAC	ECM in Res Style Furnace	BES	1	\$ 150	0.2	400	
		GS HP_Closed Loop Water to Air	BES	3	\$ 3,405	0.7	43,697	
		Setback Thermostats	BES	1	\$ 50	0.3	822	
				4	\$ 200	1.3	3,288	
		Unitary Air Cooled Split System AC	BES	1	\$ 200	0.7	722	
		Unitary Single Pkgd AC	BES	2	\$ 1,335	6.7	6,421	
					\$ 5,340	9.9	55,350	
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 150	0.0	476	
				2	\$ 100	0.0	450	
				6	\$ 300	0.1	1,350	
		Energy Star Decorative Lights	BES	6	\$ 21	0.0	51	
				12	\$ 42	0.0	102	
				35	\$ 123	0.0	296	
		Energy Star Dehumidifier	BES	1	\$ 50	0.1	440	
				2	\$ 20	0.0	176	
		Energy Star Dishwasher	BES	1	\$ 150	0.0	762	
				2	\$ 50	0.0	214	
				8	\$ 200	0.0	1,096	
		Energy Star Room AC	BES	1	\$ 15	0.1	50	
					\$ 1,221	0.4	5,463	
	Lighting - New Const	Ltng New Const _ T5HO 4ft Hi Bay Fixture	BES	14	\$ 840	3.0	7,489	
					\$ 840	3.0	7,489	
	Lighting - Retrofit	Ltng Retrofit _ CFL Fixtures & Lamps	BES	446	\$ 669	15.0	62,919	
		Ltng Retrofit _ LED & Induction Tech	BES	11	\$ 132	0.2	1,831	
		Ltng Retrofit _ Othr Eff Ltg Tech/Unit	BES	10	\$ 200	0.7	1,585	
		Ltng Retrofit _ Flrscnt T8 & T5 w/Elec Bal	BES	74	\$ 843	2.1	7,862	
		Ltng Retrofit _ T8 Hi Bay Fixtures w-Elec Bal	BES	11	\$ 935	2.4	6,068	
		Ltng Retrofit _ T5HO Hi Bay Fixtures w-Elec Bal	BES	48	\$ 7,200	16.1	99,338	
				85	\$ 5,950	7.2	31,793	
						\$ 15,929	43.8	211,396
		Res HVAC	HVAC Air_Source HP	BES	1	\$ 250	0.4	1,981
			HVAC Central AC unit	BES	1	\$ 100	0.2	157
				2	\$ 200	0.4	314	
				3	\$ 300	0.9	649	
				4	\$ 800	2.1	1,463	
				5	\$ 500	1.6	1,160	
				6	\$ 600	1.9	1,352	
				10	\$ 1,000	2.5	1,799	
	HVAC HE Furnace with ECM		BES	1	\$ 1,050	1.6	2,800	
				3	\$ 450	0.7	1,200	
				6	\$ 900	1.4	2,400	
				13	\$ 1,950	3.0	5,200	

					\$	8,100	16.7	20,475
2010 Total					\$	31,430	73.9	300,173
2011	CI HVAC	ECM in Res Style Furnace	BES	1	\$	150	0.2	400
		Mini Split Ductless Air Source HP	BES	2	\$	400	0.9	12,940
		Setback Thermostats	BES	1	\$	100	0.7	1,644
				2	\$	100	0.7	1,644
		Unitary Air Cooled Split System AC	BES	1	\$	200	0.7	694
				2	\$	300	1.1	1,040
					\$	1,250	4.2	18,362
	Energy Star Appliance	Energy Star Decorative Lights	BES	1	\$	4	0.0	25
		Energy Star Dehumidifier	BES	1	\$	30	0.1	264
				2	\$	20	0.0	176
		Energy Star Dishwasher	BES	1	\$	25	0.0	137
				4	\$	100	0.0	548
				8	\$	200	0.0	1,096
		Energy Star Refrigerators	BES	1	\$	100	0.1	810
		Energy Star Room AC	BES	1	\$	30	0.2	100
				2	\$	30	0.2	100
						\$	539	0.5
	Lighting - Retrofit	Ltng Retro _ LED & Induction Tech	BES	2	\$	24	0.0	333
				40	\$	1,000	2.0	17,160
		Ltng Retro _Flrsct T8 & T5 w/Elec Bal	BES	20	\$	270	0.7	4,104
				21	\$	273	0.6	3,974
				65	\$	411	1.1	4,850
						\$	1,978	4.4
	Res HVAC	HVAC Central AC unit	BES	1	\$	400	1.2	855
				2	\$	200	0.6	427
				5	\$	500	1.4	996
		HVAC HE Furnace with ECM	BES	1	\$	450	0.7	1,200
				3	\$	900	1.4	2,400
				8	\$	1,200	1.8	3,200
		Programmable Thermostat - NON Elec-Gas w/AC	BES	1	\$	75	0.0	561
				2	\$	100	0.0	748
				4	\$	100	0.0	748
				5	\$	125	0.0	935
				9	\$	225	0.0	1,683
						\$	4,275	7.1
	VFDs and Pumps	Variable Freq Drives	BES	4	\$	4,000	26.0	105,742
					\$	4,000	26.0	105,742
	Res Lighting	CFL Fixtures and Lamps	BES	5236	\$	7,854	20.9	203,298
					\$	7,854	20.9	203,298
2011 Total					\$	19,896	63.2	374,832
2012	CI HVAC	Demand Controlled Ventilation	BES	1	\$	89	0.3	490
		Setback/Programmable Thermostats	BES	1	\$	50	0.0	822
				2	\$	100	0.0	6,544
		Unitary Single Pkgd AC	BES	1	\$	450	2.1	2,040
					\$	689	2.4	9,896
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$	50	0.0	225
				2	\$	100	0.0	450



		Energy Star Dehumidifier	BES	1	\$	10	0.0	88
		Energy Star Dishwasher	BES	15	\$	375	0.0	2,055
		Energy Star Room AC	BES	1	\$	15	0.1	50
					\$	550	0.2	2,868
Lighting - Retrofit		Ltng Retro _ CFL Fixtures & Lamps	BES	7	\$	11	0.3	2,478
		Ltng Retro _ Flrsct T8 & T5 w/Elec Bal	BES	21	\$	273	0.8	2,288
				33	\$	198	0.5	1,761
				152	\$	1,192	2.7	23,450
		Ltng Retro _ LED & Induction Tech	BES	3	\$	36	0.1	499
				45	\$	675	2.5	6,773
		Ltng Retro _ Rducd Wtg T8 CEE Qual	BES	18	\$	324	1.3	3,494
		Ltng Retro _ T5HO Hi Bay Fix w-Elec Bal	BES	5	\$	450	1.1	2,506
					\$	3,159	9.2	43,249
Res HVAC		Air Handler _ Fan Coil with ECM	BES	1	\$	150	0.2	400
		HVAC Air_Source HP - 18.0 SEER	BES	1	\$	350	0.5	2,243
		HVAC Central AC unit	BES	1	\$	300	2.4	1,354
				2	\$	400	2.2	1,266
				3	\$	300	3.4	1,875
				4	\$	400	3.8	2,069
		HVAC HE Furnace with ECM	BES	1	\$	600	0.9	1,600
				2	\$	300	0.5	800
				3	\$	450	0.7	1,200
				4	\$	600	0.9	1,600
				8	\$	1,200	1.8	3,200
		Programmable Thermostat - Heat Pump	BES	1	\$	25	0.0	1,114
		Programmable Thermostat - Propane,						
		Fuel Oil, Boiler w/AC	BES	1	\$	75	0.0	561
				2	\$	150	0.4	1,122
				4	\$	100	0.4	748
				6	\$	150	0.6	1,122
					\$	5,550	18.7	22,274
2012 Total					\$	9,948	30.5	78,287
2013	CI HVAC	ECM in Res Style Furnace	BES	1	\$	150	0.2	400
				3	\$	450	0.7	1,200
		Setback/Programmable Thermostats	BES	1	\$	50	0.0	822
				5	\$	250	0.0	4,110
				6	\$	300	0.0	4,932
		Split System Air Source HP <65k Btuh (3ph)	BES	4	\$	725	2.0	4,016
		Unitary Air Cooled Split Sys AC <65k Btuh (3ph)	BES	1	\$	200	0.3	345
					\$	2,125	3.2	15,825
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$	150	0.1	393
		Energy Star Decorative Lights	BES	7	\$	25	0.0	548
		Energy Star Dehumidifier	BES	1	\$	20	0.2	180
		Energy Star Dishwasher	BES	1	\$	50	0.1	120
		Energy Star Refrigerators	BES	1	\$	50	0.0	405
				2	\$	100	0.1	810
		Energy Star Room AC	BES	1	\$	15	0.1	50
					\$	410	0.5	2,506
Food Service		ES Comm Dishwasher_Gas WH-Elec	BES	1	\$	90	0.3	2,600

	Boost						
	ES Comm Glass Door Refrigerators	BES	2	\$	200	0.2	1,336
	ES Comm Solid Door Freezers	BES	1	\$	100	0.1	869
			2	\$	400	0.6	5,485
	ES Comm Solid Door Refrigerators	BES	2	\$	350	0.2	1,603
				\$	1,140	1.4	11,893
Lighting - New Const	CEE Qual T8 4ft Low Wattage System	BES	19	\$	171	0.6	2,191
	LED Energy Star Recessed Downlight	BES	10	\$	250	0.7	2,413
	Ltng NC _ T5HO 4ft Hi Bay Fixture	BES	250	\$	14,820	46.6	287,135
	Ltng NC _ T8 4ft Hi Bay Fixture	BES	40	\$	1,000	3.0	18,449
				\$	16,241	50.9	310,188
Lighting - Retrofit	LED & Induction Tech	BES	60	\$	1,800	6.6	24,468
			70	\$	1,050	3.9	10,537
			278	\$	4,140	14.9	56,310
	Othr Eff Ltg Tech - per Unit	BES	5	\$	100	0.3	1,446
	T8 4ft w/Elec Bal	BES	10	\$	190	0.6	3,264
				\$	7,280	26.3	96,025
Res HVAC	Air Handler _ Fan Coil with ECM	BES	1	\$	150	0.2	400
	Desuperheater	BES	1	\$	250	0.4	1,221
	HVAC Central AC unit	BES	1	\$	300	2.4	1,335
			2	\$	400	3.4	1,857
			3	\$	900	7.5	4,115
			6	\$	600	5.3	2,910
	HVAC Closed Loop Water to Air GS HP	BES	1	\$	1,000	0.8	17,661
	HVAC HE Furnace with ECM	BES	1	\$	450	0.7	1,200
			2	\$	1,200	1.8	3,200
			4	\$	600	0.9	1,600
			5	\$	750	1.2	2,000
			6	\$	900	1.4	2,400
	Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	BES	1	\$	50	0.2	374
			2	\$	250	1.0	1,870
			3	\$	75	0.3	561
			5	\$	125	0.5	935
				\$	8,000	28.1	43,639
2013 Total				\$	35,196	110.3	480,076
Grand Total				\$	156,896	431.5	1,921,951

## Appendix 2 – Vermillion Resolution

### RESOLUTION ADOPTING INTEGRATED RESOURCE PLAN FOR SUBMITTAL TO WESTERN AREA POWER ADMINISTRATION

**WHEREAS**, the City of Vermillion purchases a significant portion of its power supply from the Western Area Power Administration (Western); and

**WHEREAS**, Western has published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing of an Integrated Resource Plan (IRP); and

**WHEREAS**, the City of Vermillion with assistance from our supplemental power supplier Missouri River Energy Services has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and

**WHEREAS**, utility customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and

**WHEREAS**, any public comments received have been addressed in order to strengthen the City's Integrated Resource Plan; and

**WHEREAS**, the IRP Summary Report includes 5-year and 2-year action plans outlining actions to be taken by the municipal utility during the next several years.

**NOW, THEREFORE BE IT RESOLVED** by the City of Vermillion City Council as follows:

That the "*Integrated Resource Plan Summary Report For the City of Vermillion*" dated September 2014 shall be approved for filing with Western under the Energy Planning and Management Program.

Passed and approved this 16<sup>th</sup> day of June, 2014.

FOR THE GOVERNING BODY OF THE  
CITY OF VERMILLION, SOUTH DAKOTA

By John E. Powell  
John E. (Jack) Powell, Mayor

ATTEST:

By Michael D. Carlson  
Michael D. Carlson, Finance Officer



## **VIII. Watertown, SD Resource Planning**

### ***A. City Information***

Watertown, located in Codington County, is a community of more than 21,400 individuals located in northeastern South Dakota. Municipal services include electricity, water, and natural gas distribution. In 2010, the residential sector included 10,050 occupied housing units. The median age of the population is 36.6 years. About 15.4% of the population is 65 years of age or older and about 24.2% are under 18 years old.

In 2012, the municipal utility had 11,158 residential customers, 2,115 commercial customers, and 210 industrial customers. The residential sector's yearly usage averaged 10,075 kWh per customer in 2012. Commercial customers averaged 43,194 kWh, and industrial customers averaged 782,181 kWh.

The rates for each type of customer are shown in Exhibit 1. Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4, which show the winter and summer peak demand and energy for the seasons 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Watertown on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 65,001 kW in the winter and 75,283 kW in the summer.

Exhibits 7 and 8 each shows the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load decreasing from midnight to roughly 5 am then increasing till 9 am. The load then begins to level off until 6 pm followed by a steady decline until 5 am the next day. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline occurs until 6 am the next day.

## Exhibit 1

### WATERTOWN, SOUTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$10.00
	\$/kWh Jun-Aug	\$.075
	\$/kWh Sep-May	\$.067
Small Commercial	Customer Charge	\$14.00
	\$/kWh Jun-Aug	\$.080
	\$/kWh Sep-May	\$.072
Large Commercial	Customer Charge	\$28.00
	\$/kW Jun-Aug	\$12.30
	\$/kW Sep-May	\$10.40
	\$/kWh	\$.033

## Exhibit 2

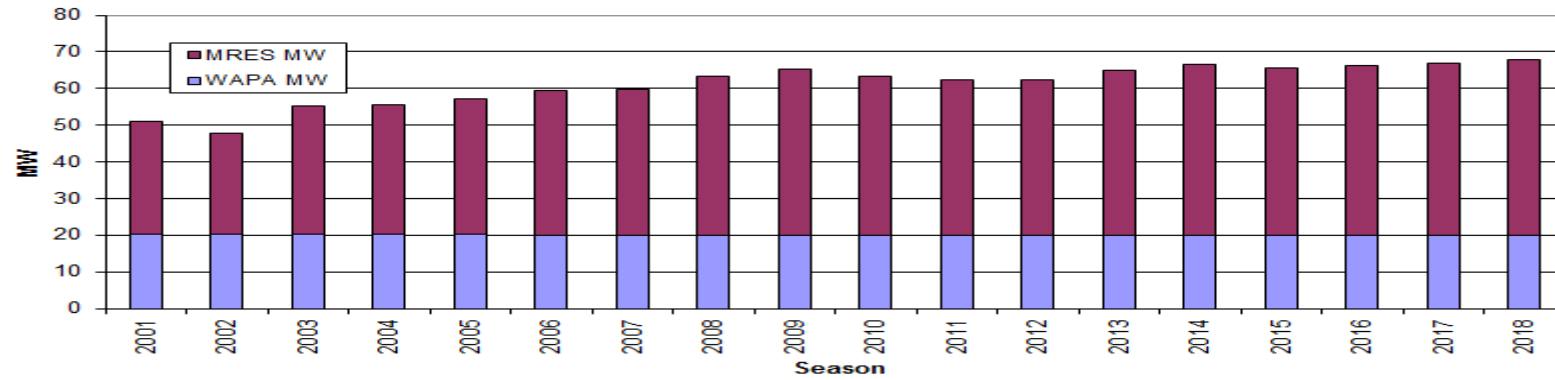
MRES Seasonal Load Report  
Watertown, SD  
Town Gate Load  
BASE Forecast

1/31/14 2:14 PM  
Town Gate Load  
Monthly Splits  
Historic Through 12/2013

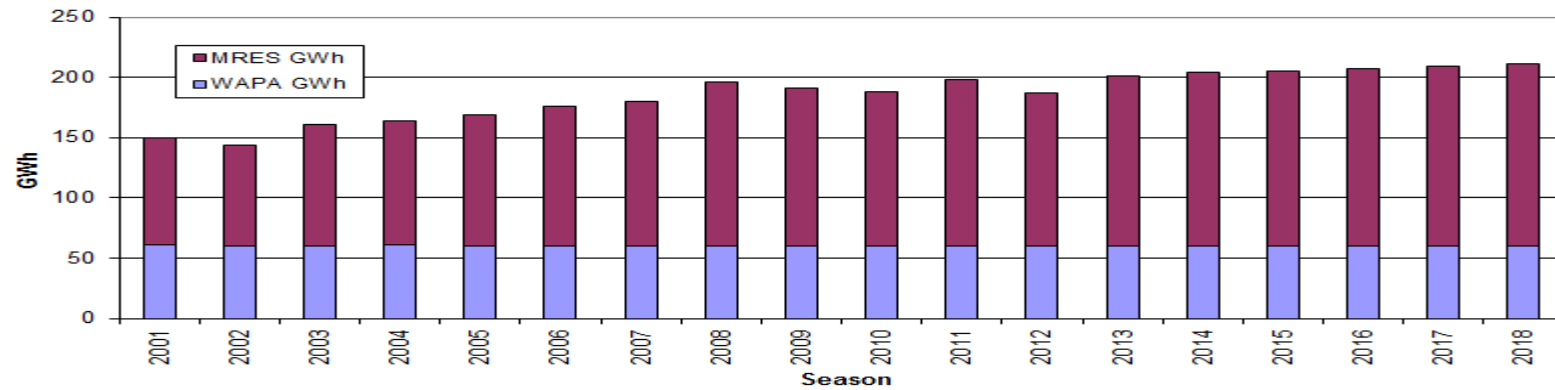
Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	60,687	24,938	35,749	0	2001	141,985,196	64,057,000	77,928,196	0
2002	60,489	24,938	35,551	0	2002	150,678,610	64,057,000	86,621,610	0
2003	63,371	24,938	38,433	0	2003	155,228,607	64,057,000	91,171,607	0
2004	63,307	24,938	38,369	0	2004	153,633,531	64,057,000	89,576,531	0
2005	68,296	24,938	43,358	0	2005	172,210,770	64,057,000	108,153,770	0
2006	71,677	24,897	46,780	0	2006	176,238,513	63,953,000	112,285,513	0
2007	70,769	24,897	45,872	0	2007	175,504,470	63,953,000	111,551,470	0
2008	68,643	24,897	43,746	0	2008	180,909,965	63,953,000	116,956,965	0
2009	63,809	24,897	40,800	0	2009	170,007,122	63,953,000	106,054,122	0
2010	71,521	24,897	46,624	0	2010	183,681,829	63,953,000	119,728,829	0
2011	76,635	24,897	51,738	0	2011	187,240,569	63,953,000	123,287,569	0
2012	74,581	24,897	49,684	0	2012	192,325,290	63,953,000	128,372,290	0
2013	75,283	24,897	50,386	0	2013	193,763,550	63,953,000	129,810,550	0
2014	73,468	24,897	48,571	0	2014	194,401,414	63,953,000	130,448,414	0
2015	74,212	24,897	49,315	0	2015	196,371,598	63,953,000	132,418,598	0
2016	74,850	24,897	49,953	0	2016	198,060,298	63,953,000	134,107,298	0
2017	75,624	24,897	50,727	0	2017	200,108,149	63,953,000	136,155,149	0
2018	76,484	24,897	51,587	0	2018	202,381,942	63,953,000	138,428,942	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	47,771	20,098	27,673	0	2002	143,382,469	60,123,000	83,259,469	0
2003	55,118	20,098	35,020	0	2003	161,208,402	60,123,000	101,085,402	0
2004	55,699	20,098	35,601	0	2004	164,267,162	60,513,000	103,754,162	0
2005	57,200	20,098	37,143	0	2005	168,997,349	60,123,000	108,874,349	0
2006	58,615	20,055	39,353	0	2006	176,128,051	60,034,000	116,094,051	0
2007	58,926	20,055	39,565	0	2007	179,770,805	59,992,000	119,778,805	0
2008	63,474	20,055	43,419	0	2008	195,660,326	60,381,000	135,279,326	0
2009	64,444	20,055	45,224	0	2009	191,180,316	59,992,000	131,188,316	0
2010	62,347	20,055	43,127	0	2010	187,973,620	59,992,000	127,981,620	0
2011	61,545	20,055	42,320	0	2011	197,903,980	59,992,000	137,911,980	0
2012	62,479	20,055	42,424	0	2012	187,358,138	60,381,000	126,977,138	0
2013	65,001	20,055	44,946	0	2013	201,267,651	59,992,000	141,275,651	0
2014	65,721	20,055	46,501	0	2014	203,957,320	59,992,000	143,965,320	0
2015	65,690	20,055	45,635	0	2015	205,013,443	59,992,000	145,021,443	0
2016	66,255	20,055	46,224	0	2016	206,884,084	60,381,071	146,503,013	0
2017	66,940	20,055	46,885	0	2017	208,899,938	59,992,000	148,907,938	0
2018	67,701	20,055	47,646	0	2018	211,200,535	59,992,000	151,208,535	0

### Exhibit 3

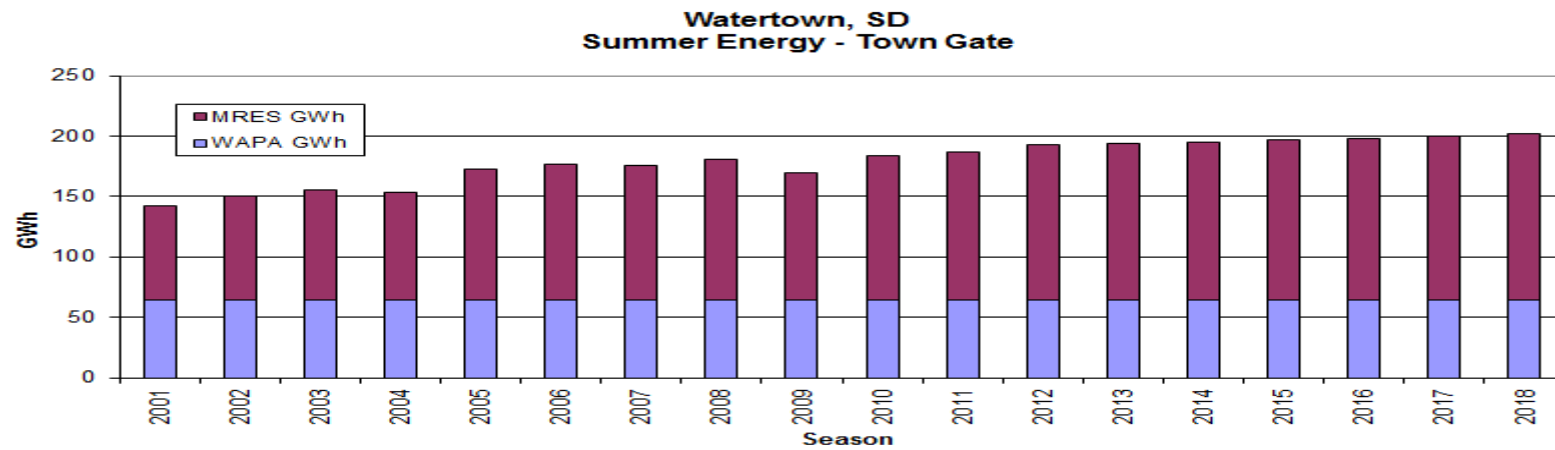
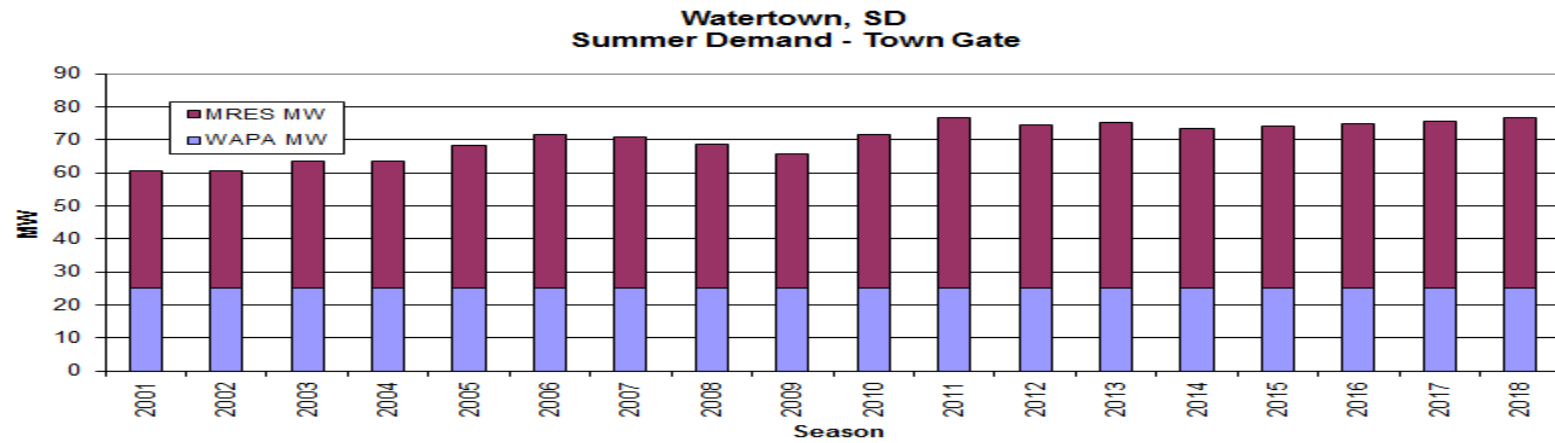
**Watertown, SD  
Winter Demand - Town Gate**



**Watertown, SD  
Winter Energy - Town Gate**



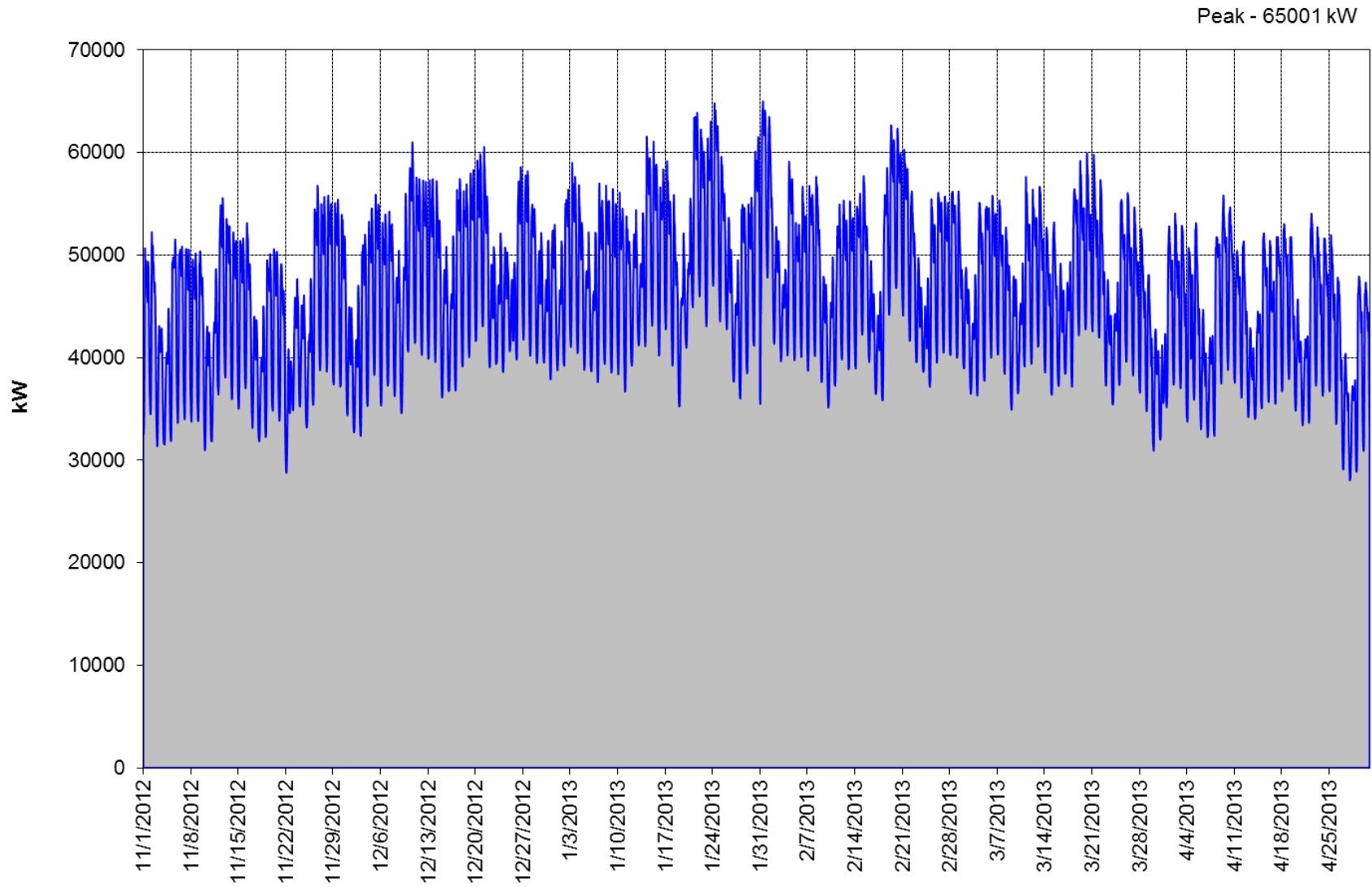
## Exhibit 4





## Exhibit 5

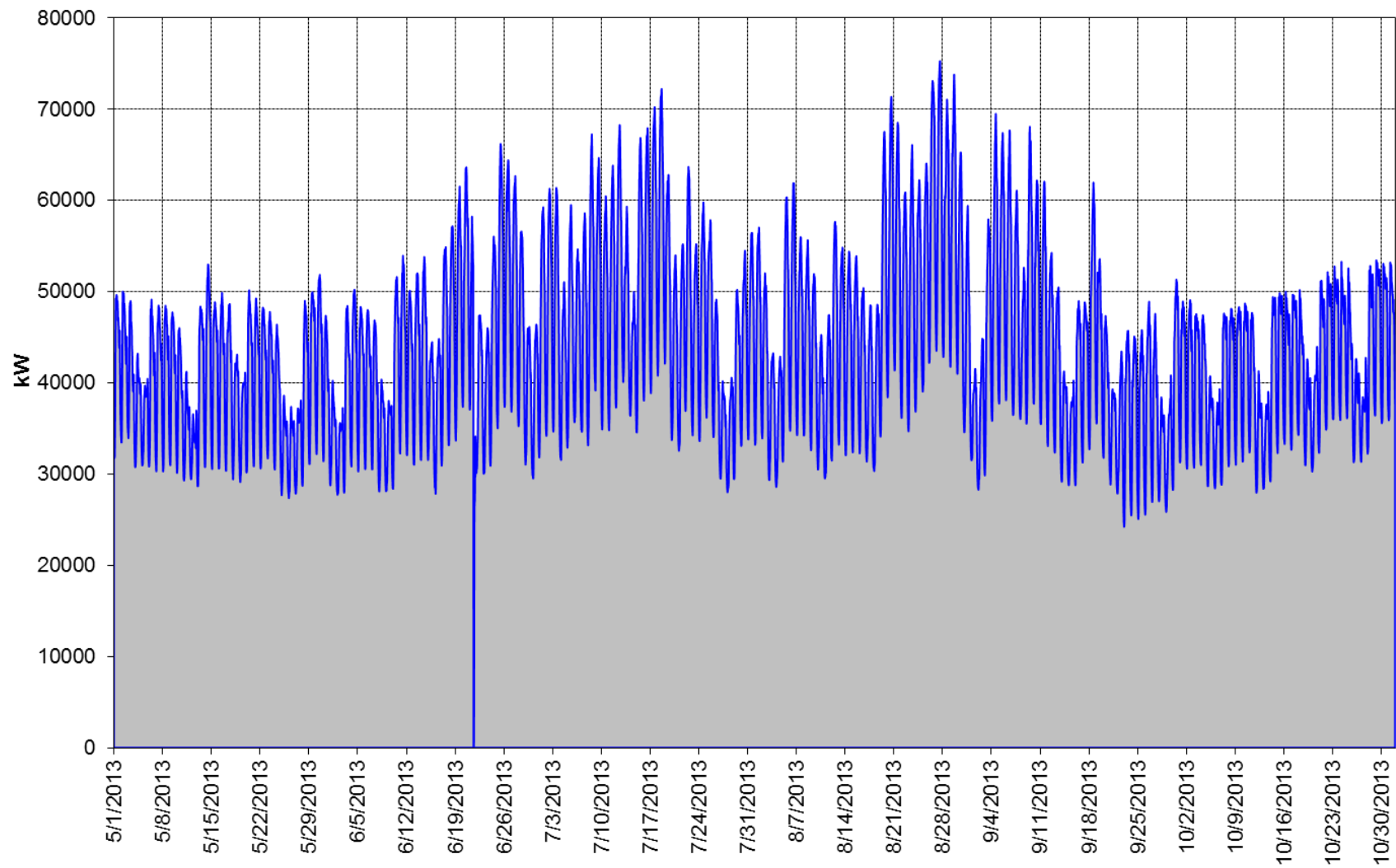
### Watertown, SD Winter 2012-2013 Half-Hour Load Shape - Town Gate



## Exhibit 6

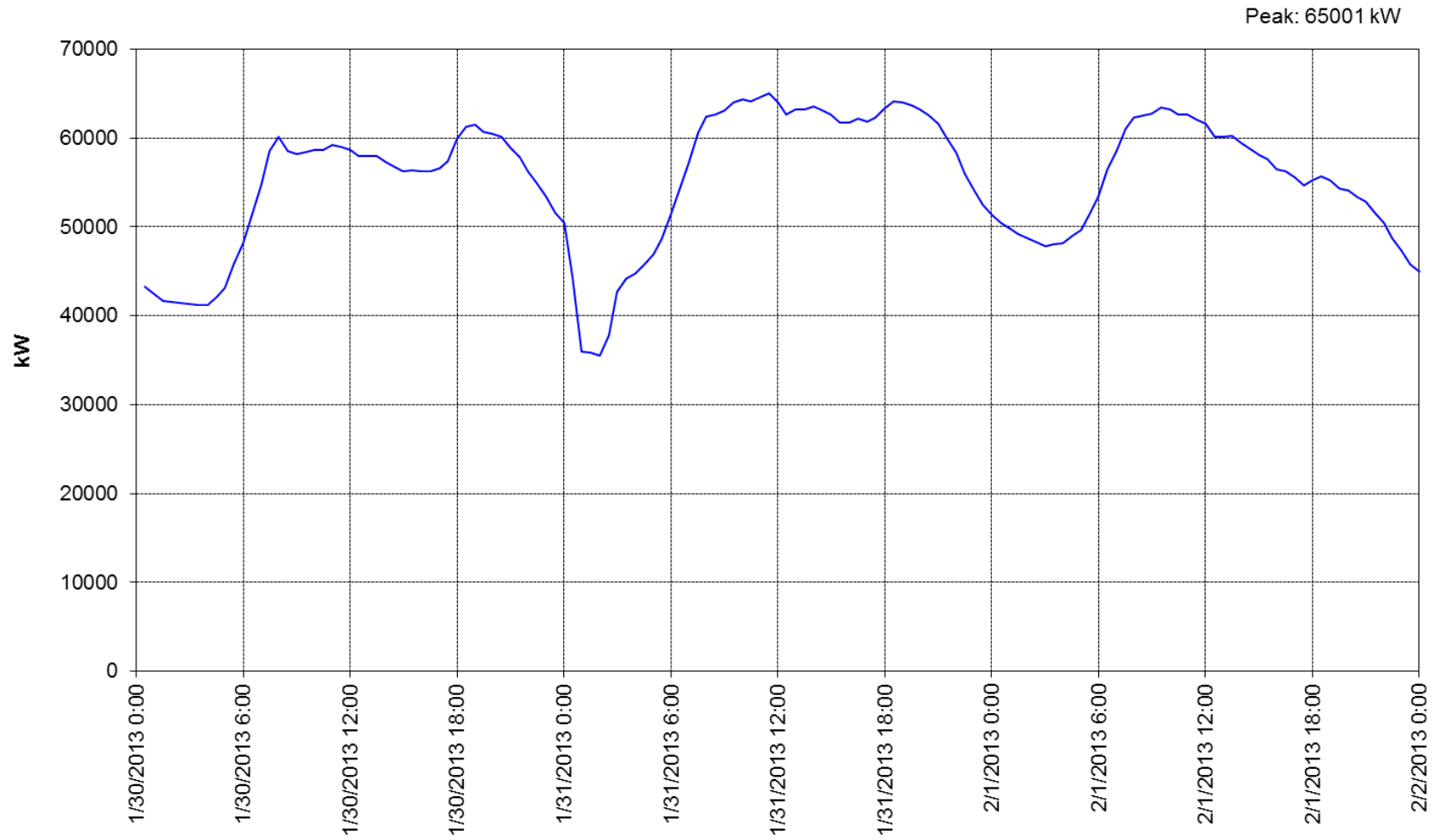
### Watertown, SD Summer 2013 Half-Hour Load Shape - Town Gate

Peak - 75284 kW



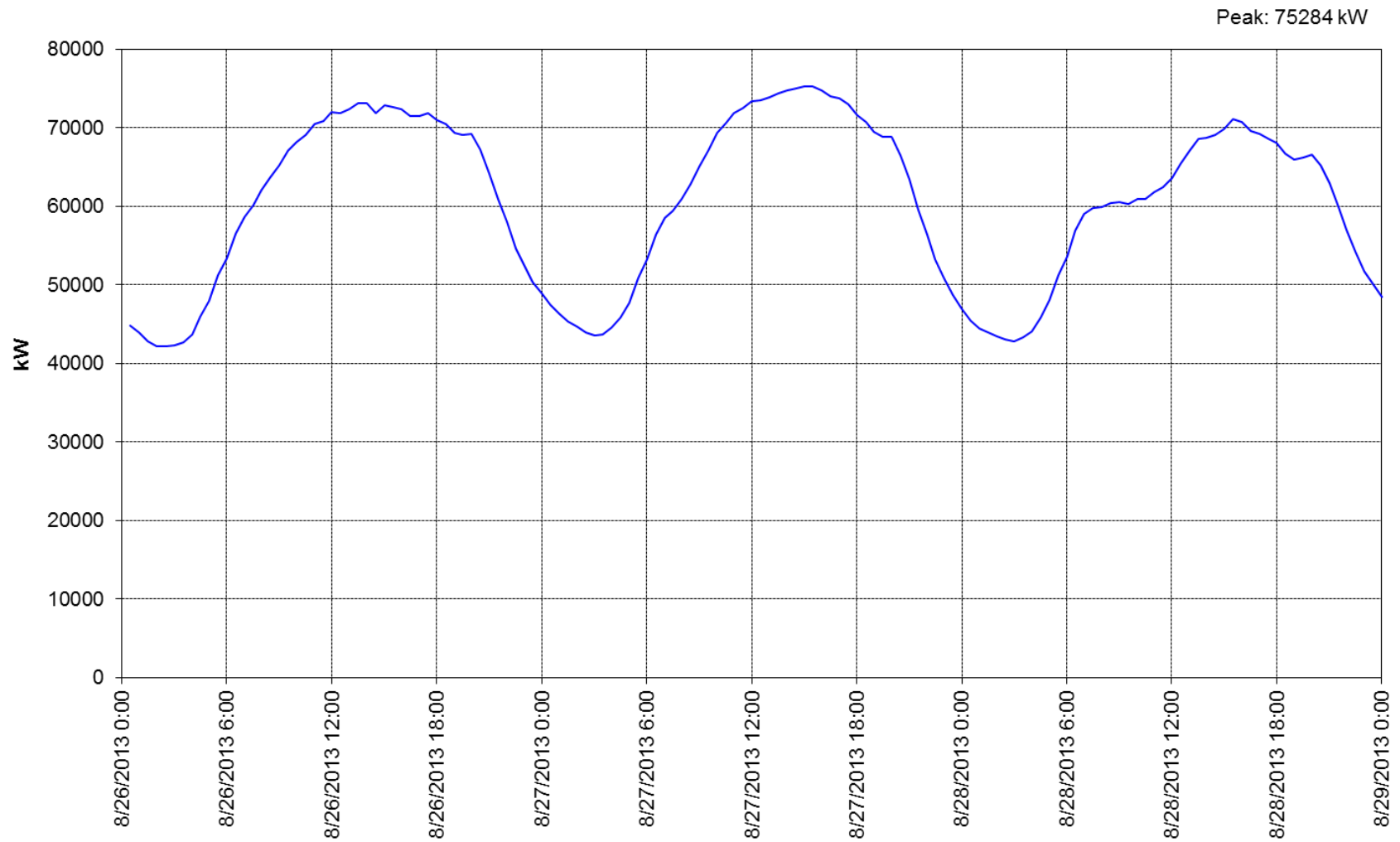
## Exhibit 7

Watertown, SD Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate



## Exhibit 8

Watertown, SD Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Watertown is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Watertown to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Watertown has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2009	CI HVAC	BES	1	\$ 5,142	13.5	11,178
	Cooling/Chiller	BES	25		41.4	229,932
	Custom Lighting	BES	7	\$ 8,861	30.1	112,284
	Energy Star Appliance	BES	44	\$ 3,540	1.8	11,836
	Lighting	BES	1644	\$ 74,909	139.7	627,996
	Lighting - New Const	BES	587	\$ 21,896	48.5	205,999
	Motors	BES	6	\$ 4,650	0.5	1,766
	Res HVAC	BES	9	\$ 5,100	7.7	18,581
	Room air conditioner	BES	3	\$ 45	0.1	177
	VFDs and Pumps	BES	9	\$ 4,000	42.0	153,614
	Res Lighting	BES	153	\$ 230	0.6	7,650
<b>2009 Total</b>			<b>2488</b>	<b>\$ 128,372</b>	<b>326.0</b>	<b>1,381,013</b>
2010	CI HVAC	BES	128	\$ 5,307	28.9	61,939
	Custom Electric Program	BES	2	\$ 1,358	4.5	12,780
	Energy Star Appliance	BES	144	\$ 5,298	1.9	19,932
	Food Service	BES	5	\$ 4,700	6.5	38,515
	Lighting - New Const	BES	464	\$ 31,420	141.4	672,168
	Lighting - Retrofit	BES	1809	\$ 82,468	240.5	1,181,217
	Res HVAC	BES	106	\$ 14,600	25.1	38,706
	VFDs and Pumps	BES	5	\$ 950	3.5	11,582
<b>2010 Total</b>			<b>2663</b>	<b>\$ 146,101</b>	<b>452.3</b>	<b>2,036,839</b>
2011	CI HVAC	BES	33	\$ 9,148	34.6	37,627
	Compressed Air System	BES	2	\$ 4,435	40.3	423,299
	Custom Electric Program	BES	4	\$ 11,034	37.0	186,547
	Energy Star Appliance	BES	99	\$ 3,338	1.8	18,960
	Lighting - New Const	BES	707	\$ 20,535	75.2	527,846
	Lighting - Retrofit	BES	1450	\$ 94,445	246.7	1,351,048
	Res HVAC	BES	81	\$ 12,916	23.2	91,622
	VFDs and Pumps	BES	77	\$ 31,145	135.7	682,791
	Res Lighting	BES	74	\$ 111	0.3	2,873
<b>2011 Total</b>			<b>2527</b>	<b>\$ 187,107</b>	<b>594.9</b>	<b>3,322,613</b>
2012	CI HVAC	BES	20	\$ 15,235	52.2	122,248
	Comm Refrigeration Audit	BES	2	\$ -	0.5	4,067
	Compressed Air System	BES	3	\$ 5,313	24.7	231,744
	Custom Electric Program	BES	2	\$ 2,410	8.2	23,511
	Energy Star Appliance	BES	45	\$ 1,580	1.1	9,471
	Lighting - New Const	BES	463	\$ 23,350	101.5	433,754
	Lighting - Retrofit	BES	2541	\$ 80,249	225.9	1,130,135
	Res HVAC	BES	194	\$ 14,010	28.8	128,295
	Comm Refrigeration	BES	1	\$ 300	0.6	5,148
<b>2012 Total</b>			<b>3271</b>	<b>\$ 142,446</b>	<b>443.4</b>	<b>2,088,373</b>
2013	CI HVAC	BES	23	\$ 14,445	43.2	15,395
	Compressed Air System	BES	5	\$ 6,734	35.3	216,675
	Custom Electric Program	BES	7	\$ 86,678	294.7	1,732,780
	Energy Star Appliance	BES	43	\$ 1,478	1.2	7,463
	Food Service	BES	5	\$ 700	0.8	7,240
	Lighting - New Const	BES	308	\$ 15,295	53.0	249,056
	Lighting - Retrofit	BES	3333	\$ 43,724	108.2	459,020
	Res HVAC	BES	103	\$ 10,825	33.4	73,272
	VFDs and Pumps	BES	8	\$ 1,820	10.1	32,301
	Comm Refrigeration	BES	17	\$ 1,097	2.5	35,955
<b>2013 Total</b>			<b>3852</b>	<b>\$ 182,796</b>	<b>582.5</b>	<b>2,829,157</b>
<b>Grand Total</b>			<b>14801</b>	<b>\$ 786,822</b>	<b>2,399.2</b>	<b>11,657,995</b>

## ***D. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Watertown was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

## ***E. Options Chosen – Development of Action Plan***

DSM software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or is planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

### ***i. Future Actions***

It is assumed that Watertown will continue to participate in the Bright Energy Solutions program. All MRES members pay for the cost of the Bright Energy Solutions program through their rates. However, Watertown would have virtually no direct costs to implement these programs, as MRES will be paying the incentive costs for all of these activities. It is planned that Watertown will participate in all of the Bright Energy Solutions programs to the extent possible, with the exception of the Appliance Turn-In measures, where Watertown Utility personnel has identified that participation levels might be reduced due to the lack of market potential. This assumption was made only to obtain more realistic expectations for the five-year plan, and is certainly not considered to be a cap on participation in the event that the program attracts more participants than anticipated.

Watertown recently completed a pilot study investigating the effectiveness of an automated meter reading system that would allow for direct load control of residential air conditioners and water heaters. The results of the study indicated a payback period that was longer than hoped. At this time, Watertown has no plans to install residential direct load control, but will continue to consider doing so in the future if the technology and/or economics improve.

Representatives from Watertown plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, it is unknown if Watertown will participate in the MRES Coordinated Demand Response (CDR) program in the future. That decision will be evaluated in years to come.

***ii. Milestones***

As part of the annual WAPA IRP updates, Watertown will evaluate the progress on these programs. The success will be measured against this 5-year plan, with adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

***F. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

***G. Public Participation***

A preliminary draft of this report was produced on April 30, 2014. The public hearing on the IRP was held at the June 30, 2014 Watertown Municipal Utilities



Board meeting. No comments or responses were made during the meeting. The Watertown Municipal Utilities Board approved the resolution on June 30, 2014. A copy of the approved resolution is included in Appendix 2.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b><i>4/30/2014</i></b>
Public Hearing Date	<b><i>6/30/2014</i></b>
Date Approved by Utilities Board	<b><i>6/30/2014</i></b>

## Appendix 1 – Detailed DSM Measures Installed

Utility Watertown

Year	Program	Measure	BES or City	Quan	Incentive	kW	kWh
2009	CI HVAC	Air Cooled Chiller	BES	1	\$ 5,142	13.5	11,178
					<b>\$ 5,142</b>	<b>13.5</b>	<b>11,178</b>
	Cooling/Chiller	Chilled water reset 85.7 tons	BES	1		0.7	2,700
		Program. Thermostat	BES	24		40.7	227,232
						<b>41.4</b>	<b>229,932</b>
	Custom Lighting	T8 4' 2L	BES	1	\$ 1,980	6.6	28,060
		T8 4' 2L-reflec	BES	1	\$ 2,530	9.0	35,580
		T8 HB 6L	BES	1	\$ 4,351	14.5	48,644
					<b>\$ 8,861</b>	<b>30.1</b>	<b>112,284</b>
	Energy Star Appliance	AJ0210EO	BES	1	\$ 10	0.1	92
		Bosch SHE45C05UC	BES	1	\$ 25	0.0	144
		Bosch SHE45M02UC	BES	1	\$ 50	0.1	288
		Bosch SHV68M03UC	BES	1	\$ 25	0.0	144
		Bosch WFMCS801UC	BES	1	\$ 100	0.1	330
		Danby DDR5009FEE	BES	1	\$ 10	0.1	92
		DM45EA	BES	1	\$ 10	0.1	92
		Electrolux EIFLW551W	BES	1	\$ 50	0.0	165
		Electrolux EIFLW55HIWO	BES	1	\$ 100	0.1	330
		FAFW3577KWO	BES	1	\$ 50	0.0	165
		FDF50S1	BES	1	\$ 10	0.1	92
		Fisher & Paykel WL37T26DW7	BES	1	\$ 50	0.0	165
		Frigidaire 6LTF2940FS	BES	1	\$ 50	0.0	165
		Frigidaire ATF7000FS1	BES	1	\$ 50	0.0	165
		Frigidaire ATF8000FSI	BES	1	\$ 50	0.0	165
		Frigidaire FAFW3577K	BES	1	\$ 50	0.0	165
		Frigidaire FAFW3577KWO	BES	1	\$ 50	0.0	165
		Frigidaire GLTF2940	BES	1	\$ 50	0.0	165
		Frigidaire GLTF2940FS	BES	1	\$ 100	0.1	330
		Frigidaire GLTF2940FS2	BES	1	\$ 50	0.0	165
		Frigidaire GLTF2940K	BES	1	\$ 50	0.0	165
		FWFLW65H1W	BES	1	\$ 50	0.0	165
		GLTF2940FS	BES	1	\$ 150	0.1	495
		Kenmore 13892	BES	1	\$ 25	0.0	144
		Kenmore 4751102	BES	1	\$ 50	0.0	165
		Kitchen Aid KUDK03IT	BES	1	\$ 25	0.0	144
		Maytag MDB8601	BES	1	\$ 25	0.0	144
		Maytag MHWE300VW	BES	1	\$ 50	0.0	165
		Maytag MVWB750WQ	BES	1	\$ 50	0.0	165
		MDB6701A	BES	1	\$ 50	0.1	288
		SHX36L15UC	BES	1	\$ 25	0.0	144
		WFMCS801UC	BES	1	\$ 50	0.0	165
		Whirlpool GU2275XTVY	BES	1	\$ 25	0.0	144
		Whirlpool GU227SXTVB	BES	1	\$ 25	0.0	144

Lighting	Whirlpool GU2300XTV80	BES	1	\$	50	0.1	288
	Whirlpool GU3600XTV	BES	1	\$	25	0.0	144
	(blank)	BES	(blank)	\$	1,875	0.3	5,183
				\$	3,540	1.8	11,836
	LED exit sign	BES	6	\$	72	0.2	996
			10	\$	240	0.9	4,980
			24			0.7	3,984
	LED ped signals	BES	56			1.6	9,016
	LED traffic signals	BES	275	\$	8,107	16.2	90,200
	T8 4' 1L	BES	25	\$	719	0.3	1,175
	T8 4' 2L	BES	3			0.0	165
			15	\$	3,371	0.2	825
			16	\$	3,359	0.2	880
			99			1.5	5,445
			168	\$	1,885	2.5	9,240
	T8 4' 3L	BES	10			0.3	1,190
			63	\$	693	2.0	7,497
	T8 4' 4L	BES	2			0.1	252
			4	\$	744	0.1	504
			42	\$	3,096	1.4	5,292
			59			1.9	7,434
	T8 HB 4L	BES	4			0.5	2,012
			6	\$	438	0.7	3,018
	T8 HB 6L	BES	4	\$	340	0.6	2,572
			8			1.2	5,144
			15	\$	1,275	2.2	9,645
			18	\$	1,530	2.6	11,574
			21	\$	1,905	3.1	13,503
			22	\$	1,870	3.2	14,146
			23	\$	1,955	3.4	14,789
			24	\$	2,040	3.5	15,432
			30			4.4	19,290
			35	\$	-	10.3	45,010
			37	\$	3,145	5.4	23,791
			40	\$	3,400	5.9	25,720
			56	\$	3,360	8.2	36,008
			70	\$	5,950	10.3	45,010
			74	\$	6,290	10.9	47,582
			91	\$	7,735	13.4	58,513
			134	\$	11,390	19.7	86,162
				\$	74,909	139.7	627,996
Lighting - New Const	Occup. Sensors	BES	24			1.7	6,600
	T5 4' 1L	BES	2			0.0	118
	T5 4' 2L	BES	66			0.7	2,706
	T5 HO 6L	BES	15	\$	1,340	2.2	9,645
			68	\$	5,440	10.0	43,724
	T5HO 6L	BES	128			18.8	82,304
	T8 HB 6L	BES	20	\$	1,272	2.9	12,860
			27	\$	1,620	4.0	17,361
	T8 HP 4' 1L	BES	42	\$	12,224	0.2	714

		T8 HP 4' 2L	BES	15		0.2	765
		T8 HP 4' 3L	BES	106		2.0	7,526
		T8 HP 4' 4L	BES	23		0.4	1,633
		T8HP 4' 3L	BES	9		0.2	639
		CFL Fixtures and Lamps	BES	42		5.1	19,404
					\$ 21,896	48.5	205,999
<b>Motors</b>		15HP motor	BES	2		0.2	796
		20HP Motor	BES	2		0.2	796
		5HP Motor	BES	2	\$ 4,650	0.1	174
					\$ 4,650	0.5	1,766
<b>Res HVAC</b>		14.5 SEER AC	BES	1	\$ 250	0.1	42
		18 SEER AC	BES	1		0.2	90
		ECM-gas furnace	BES	1	\$ 1,000	1.1	5,677
		(blank)	BES	(blank)	\$ 3,850	6.4	12,772
					\$ 5,100	7.7	18,581
<b>Room air conditioner</b>		Friedrich CP08E10	BES	1	\$ 15	0.0	59
		Frigidaire FAC126P1A	BES	1	\$ 15	0.0	59
		Frigidaire FAH106S2T	BES	1	\$ 15	0.0	59
					\$ 45	0.1	177
<b>VFDs and Pumps</b>		100HP VFD	BES	1	\$ 4,000	22.5	82,690
		15HP Pump	BES	2		1.6	4,774
		15HP VFD	BES	2		6.7	24,806
		20HP VFD	BES	2		9.0	33,076
		5HP VFD	BES	2		2.2	8,268
					\$ 4,000	42.0	153,614
<b>Res Lighting</b>		153 CFL bulbs	BES	153	\$ 230	0.6	7,650
					\$ 230	0.6	7,650
<b>2009 Total</b>					<b>\$ 128,372</b>	<b>326.0</b>	<b>1,381,013</b>
<b>2010</b>	<b>CI HVAC</b>	ECM in Res Style Furnace	BES	1	\$ 150	0.2	400
				2	\$ 300	0.5	800
		Pkgd Terminal AC (PTAC)	BES	64	\$ 960	7.8	10,356
		Setback Thermostats	BES	60	\$ 3,000	19.8	49,320
		Window Film	BES	1	\$ 897	0.6	1,063
					\$ 5,307	28.9	61,939
	<b>Custom Electric Program</b>	Custom	BES	1	\$ 1,358	4.5	12,780
					\$ 1,358	4.5	12,780
	<b>Energy Star Appliance</b>	Energy Star Clothes Washer	BES	1	\$ 100	0.0	450
				2	\$ 100	0.0	450
				3	\$ 300	0.1	1,350
				4	\$ 200	0.1	900
				5	\$ 500	0.2	2,250
				13	\$ 650	0.2	2,527
				45	\$ 2,250	0.5	5,946
		Energy Star Decorative Lights	BES	5	\$ 18	0.0	42
		Energy Star Dehumidifier	BES	1	\$ 30	0.1	264
				4	\$ 40	0.1	352
				6	\$ 60	0.1	528
		Energy Star Dishwasher	BES	1	\$ 75	0.0	411
				2	\$ 150	0.0	822
				7	\$ 175	0.0	719

			23	\$	575	0.0	2,671	
	Energy Star Room AC	BES	1	\$	45	0.3	150	
			2	\$	30	0.2	100	
				\$	5,298	1.9	19,932	
Food Service	ES Comm Solid Door Refrigerators	BES	2	\$	200	0.1	940	
	ES Convection Ovens _ Electric Only	BES	1	\$	1,500	2.1	12,525	
			2	\$	3,000	4.2	25,050	
				\$	4,700	6.5	38,515	
Lighting - New Const	Ltng New Const _ T5HO 4ft Hi Bay Fixture	BES	17	\$	1,360	6.0	17,150	
			447	\$	30,060	135.4	655,018	
				\$	31,420	141.4	672,168	
Lighting - Retrofit	Ltng Retrofit _ CFL Fixtures & Lamps	BES	84	\$	126	4.5	12,301	
			532	\$	798	15.8	69,180	
	Ltng Retrofit _ LED & Induction Tech	BES	6	\$	72	0.1	999	
			9	\$	108	0.2	1,498	
	Ltng Retrofit _Flrsct T8 & T5 w/Elec Bal	BES	7	\$	42	0.1	226	
			82	\$	555	0.9	3,922	
	Ltng Retrofit _ T8 Hi Bay Fixtures w-Elec Bal	BES	23	\$	1,955	5.1	12,103	
			93	\$	7,905	22.5	98,597	
			103	\$	8,755	22.8	140,688	
			610	\$	51,850	152.4	795,285	
	Ltng Retrofit _ Rducd Wtg T8 CEE Qual	BES	149	\$	2,052	3.6	9,825	
	Ltng Retrofit _ Othr Eff Ltg Tech/Ctld	BES	1	\$	270	1.1	8,349	
	Ltng Retrofit _ T5HO Hi Bay Fixtures w-Elec Bal	BES	16	\$	1,120	1.4	3,280	
			18	\$	1,260	1.5	4,970	
			76	\$	5,600	8.4	19,994	
				\$	82,468	240.5	1,181,217	
Res HVAC	Air Handler _ Fan Coil with ECM	BES	1	\$	300	0.5	800	
	HVAC Air_Source HP	BES	1	\$	500	0.8	3,962	
	HVAC Central AC unit	BES	1	\$	100	0.2	122	
			2	\$	600	1.6	1,068	
			3	\$	300	0.8	539	
			4	\$	800	1.8	1,306	
			6	\$	1,200	3.0	2,109	
	HVAC HE Furnace with ECM	BES	2	\$	600	0.9	1,600	
			3	\$	450	0.7	1,200	
			4	\$	1,200	1.8	3,200	
			6	\$	900	1.4	2,400	
			7	\$	2,100	3.2	5,600	
			8	\$	2,400	3.7	6,400	
			21	\$	3,150	4.8	8,400	
				\$	14,600	25.1	38,706	
VFDs and Pumps	Variable Freq Drives	BES	3	\$	800	3.3	10,819	
	Replace on Failure 3 Phase _ 1800 RPM	BES	2	\$	150	0.2	763	
				\$	950	3.5	11,582	
2010 Total				\$	146,101	452.3	2,036,839	
2011	CI HVAC	Air Cooled Chiller	BES	1	\$	2,280	7.7	7,412

	ECM in Res Style Furnace	BES	1	\$	300	0.5	800
			5	\$	750	1.2	2,000
	Setback Thermostats	BES	11	\$	550	3.6	9,042
	Unitary Air Cooled Split System AC	BES	1	\$	175	0.6	632
			7	\$	3,133	11.3	10,847
	Unitary Single Pkgd AC	BES	6	\$	1,960	9.8	6,894
				\$	<b>9,148</b>	<b>34.6</b>	<b>37,627</b>
<b>Compressed Air System</b>	Compressed Air System Leak Survey	BES	2	\$	4,435	40.3	423,299
				\$	<b>4,435</b>	<b>40.3</b>	<b>423,299</b>
<b>Custom Electric Program</b>	Custom	BES	1	\$	8,400	28.0	181,111
	36 Energy Star ceiling fans	BES	1	\$	900	3.2	5,436
	Installed enregy recovery unit	BES	1	\$	1,734	5.8	0
				\$	<b>11,034</b>	<b>37.0</b>	<b>186,547</b>
<b>Energy Star Appliance</b>	Energy Star Clothes Washer	BES	1	\$	150	0.1	675
			2	\$	200	0.1	900
			3	\$	150	0.1	675
			4	\$	400	0.2	1,800
			17	\$	850	0.4	3,825
	Energy Star Decorative Lights	BES	8	\$	28	0.0	204
	Energy Star Dehumidifier	BES	1	\$	30	0.1	264
			2	\$	100	0.2	880
	Energy Star Dishwasher	BES	2	\$	50	0.0	274
			3	\$	150	0.0	822
			5	\$	125	0.0	685
			13	\$	325	0.0	1,781
	Energy Star Refrigerators	BES	1	\$	200	0.2	1,620
			2	\$	200	0.2	1,620
			3	\$	150	0.1	1,215
			4	\$	200	0.2	1,620
	Energy Star Room AC	BES	1	\$	30	0.2	100
				\$	<b>3,338</b>	<b>1.8</b>	<b>18,960</b>
<b>Lighting - New Const</b>	Ltng NC _ Hi Bay Occupancy Sensor	BES	5	\$	50	0.1	3,738
			8	\$	80	0.2	5,981
	Ltng NC _ T5HO 4ft Hi Bay Fixture	BES	37	\$	2,590	12.7	133,116
			130	\$	9,100	31.1	178,205
	Ltng NC _ T8 4ft Hi Bay Fixture	BES	2	\$	100	0.7	3,851
			12	\$	600	3.2	17,722
			16	\$	960	5.8	30,807
			28	\$	1,400	5.3	30,043
			32	\$	1,920	6.1	34,335
			72	\$	1,440	5.0	43,871
	Ltng NC_Low Watt T8 Fixture	BES	365	\$	2,295	4.9	46,177
				\$	<b>20,535</b>	<b>75.2</b>	<b>527,846</b>
<b>Lighting - Retrofit</b>	Ltng Retro _ CFL Fixtures & Lamps	BES	4	\$	6	0.2	656
	Ltng Retro _ Hi Perf T8 CEE Qual	BES	19	\$	245	1.1	2,860
	Ltng Retro _ Hi Perf T8 Replacing Specific Fixtures	BES	110	\$	1,760	3.7	10,114
	Ltng Retro _ LED & Induction Tech	BES	6	\$	72	0.1	999
	Ltng Retro _ Othr Eff Ltng Tech/Unit	BES	10	\$	400	0.9	9,970

Res HVAC	Ltng Retro _ T5HO Hi Bay Fix w-Elec Bal	BES	15	\$	1,350	3.4	12,582
			65	\$	11,750	35.1	204,827
			72	\$	5,040	6.2	38,316
	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	6	\$	510	1.3	3,157
			8	\$	680	1.8	4,413
			10	\$	850	2.2	5,262
			26	\$	2,210	5.7	33,400
			81	\$	6,885	23.0	121,006
			133	\$	11,305	29.5	181,665
			154	\$	12,850	31.2	110,575
	Ltng Retro _ Flrscnt T8 & T5 w/Elec Bal	BES	412	\$	35,020	91.4	562,752
			4	\$	72	0.2	798
			9	\$	162	0.4	1,824
			13	\$	169	0.4	1,586
			28	\$	364	0.9	3,416
			70	\$	896	2.8	20,144
			185	\$	1,669	4.4	18,553
	Ltng Retro_Rducd Wtg T8 Fixture	BES	10	\$	180	0.6	2,173
				\$	94,445	246.7	1,351,048
	Air Handler _ Fan Coil with ECM	BES	1	\$	300	0.5	800
	Desuperheater	BES	1	\$	250	0.6	1,221
			2	\$	500	1.1	2,442
	HVAC Air_Source HP	BES	1	\$	500	0.8	3,962
	HVAC Central AC unit	BES	1	\$	200	0.5	334
			2	\$	600	1.4	1,025
			5	\$	500	1.1	806
	HVAC Closed Loop Water to Air GS HP	BES	1	\$	908	2.8	12,488
			3	\$	2,634	5.0	41,043
	HVAC HE Furnace with ECM	BES	1	\$	450	0.7	1,200
			2	\$	600	0.9	1,600
			3	\$	450	0.7	1,200
			4	\$	600	0.9	1,600
			5	\$	750	1.2	2,000
			6	\$	900	1.4	2,400
			7	\$	1,050	1.6	2,800
			9	\$	1,350	2.1	3,600
	Programmable Thermostat - Elec Heat w/AC	BES	1	\$	50	0.0	6,816
	Programmable Thermostat - Heat Pump	BES	1	\$	50	0.0	2,228
	Programmable Thermostat - NON Elec-Gas w/AC	BES	1	\$	100	0.0	748
			2	\$	50	0.0	374
			5	\$	125	0.0	935
				\$	12,916	23.2	91,622
VFDs and Pumps	Hi_Eff Pumps	BES	2	\$	800	0.0	9,440
			5	\$	1,800	0.0	21,240
	Repl on Fail 3 Phase _ 1200 RPM	BES	2	\$	150	0.1	1,177
			3	\$	1,125	0.9	10,548
	Repl on Fail 3 Phase _ 1800 RPM	BES	1	\$	150	0.1	1,151
			5	\$	850	1.1	5,580
			6	\$	330	0.4	3,903

				22	\$	4,000	4.3	47,310
	Repl on Fail 3 Phase _ 3600 RPM	BES		1	\$	275	0.2	1,958
				2	\$	300	0.1	575
	Variable Freq Drives	BES		2	\$	800	3.3	11,360
				3	\$	800	5.2	16,794
				9	\$	6,200	40.3	145,446
				10	\$	10,940	71.4	354,634
	VFD Air Compressor	BES		1	\$	2,625	8.3	51,675
					\$	31,145	135.7	682,791
Res Lighting	CFL Fixtures and Lamps	BES		74	\$	111	0.3	2,873
					\$	111	0.3	2,873
<b>2011 Total</b>					\$	187,107	594.9	3,322,613
2012	CI HVAC							
	Desuperheater	BES		2	\$	500	0.7	2,442
	GS HP_Closed Loop Water to Water	BES		2	\$	3,000	2.3	59,115
	Mini Split Ductless Air Source HP	BES		1	\$	200	0.4	6,470
	Setback/Programmable Thermostats	BES		1	\$	50	0.0	1,911
				6	\$	300	0.0	5,292
	Unitary Single Pkgd AC	BES		2	\$	6,500	25.9	24,968
				6	\$	4,685	22.9	22,050
					\$	15,235	52.2	122,248
Comm Refrigeration								
Audit	Coil Cleaning kit	BES		1	\$	-	0.4	3,656
	LED Screw-in Replacement Lamp	BES		1	\$	-	0.0	411
					\$	-	0.5	4,067
Compressed Air								
System	Compressed Air System Leak Survey	BES		1	\$	1,498	12.7	156,643
	VFD Air Compressor	BES		1	\$	3,815	12.0	75,101
					\$	5,313	24.7	231,744
Custom Electric								
Program	Custom	BES		1	\$	1,210	4.2	11,031
	Custom Lighting	BES		1	\$	1,200	4.0	12,480
					\$	2,410	8.2	23,511
Energy Star Appliance								
	Energy Star Ceiling Fans	BES		1	\$	25	0.1	151
	Energy Star Clothes Washer	BES		1	\$	150	0.1	675
				2	\$	300	0.1	1,350
				3	\$	150	0.1	675
				4	\$	200	0.1	900
	Energy Star Decorative Lights	BES		7	\$	25	0.0	178
	Energy Star Dehumidifier	BES		1	\$	10	0.0	88
				3	\$	30	0.1	264
	Energy Star Dishwasher	BES		1	\$	75	0.0	411
				2	\$	50	0.0	274
	Energy Star Refrigerators	BES		1	\$	200	0.2	1,620
				2	\$	200	0.2	1,620
				3	\$	150	0.1	1,215
	Energy Star Room AC	BES		1	\$	15	0.1	50
					\$	1,580	1.1	9,471
Lighting - New Const								
	Ltng NC _ Hi Bay Occupancy Sensor	BES		34	\$	340	1.0	7,372
	Ltng NC _ T5HO 4ft Hi Bay Fixture	BES		34	\$	2,380	5.7	22,215
				44	\$	3,080	11.1	26,461
	Ltng NC _ T8 4ft Hi Bay Fixture	BES		26	\$	1,300	9.3	30,538



			38	\$	1,900	17.8	62,001
			287	\$	14,350	56.5	285,167
				\$	<b>23,350</b>	<b>101.5</b>	<b>433,754</b>
<b>Lighting - Retrofit</b>	Ltng Retro _ CFL Fixtures & Lamps	<b>BES</b>	398	\$	148	11.6	51,234
	Ltng Retro _ Flrsct T8 & T5 w/Elec Bal	<b>BES</b>	39	\$	388	1.2	3,208
			67	\$	871	2.7	7,301
			72	\$	936	2.4	8,785
	Ltng Retro _ Hi Perf T8 Replacing Specific Fixtures	<b>BES</b>	35	\$	1,050	2.7	6,686
	Ltng Retro _ LED & Induction Tech	<b>BES</b>	65	\$	975	3.6	9,784
			92	\$	1,380	5.1	13,848
			137	\$	2,055	7.6	20,622
	Ltng Retro _ Rducd Wtg T8 CEE Qual	<b>BES</b>	30	\$	540	1.8	6,520
			694	\$	8,023	25.0	91,718
	Ltng Retro _ T5HO Hi Bay Fix w-Elec Bal	<b>BES</b>	17	\$	1,190	1.5	3,485
	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	<b>BES</b>	8	\$	680	1.8	4,210
			40	\$	3,400	8.9	54,636
			45	\$	3,825	10.2	27,615
			57	\$	3,990	7.7	18,308
			580	\$	49,300	128.6	792,224
	Ltng Retro _Flrsct T8 & T5 w/Elec Bal	<b>BES</b>	165	\$	1,498	3.7	9,951
				\$	<b>80,249</b>	<b>225.9</b>	<b>1,130,135</b>
<b>Res HVAC</b>	Air Handler _ Fan Coil with ECM	<b>BES</b>	2	\$	600	0.9	1,600
			3	\$	450	0.7	1,200
	Desuperheater	<b>BES</b>	1	\$	250	0.4	1,221
	HVAC Central AC unit	<b>BES</b>	1	\$	100	0.2	154
			3	\$	900	4.3	2,424
			4	\$	800	2.3	1,363
			5	\$	500	1.1	814
	HVAC Closed Loop Water to Air GS HP	<b>BES</b>	1	\$	1,000	0.3	18,992
	HVAC Closed Loop Water to Water GS HP	<b>BES</b>	1	\$	1,860	0.5	35,033
	HVAC HE Furnace with ECM	<b>BES</b>	1	\$	150	0.2	400
			2	\$	900	1.4	2,400
			3	\$	900	1.4	2,400
			4	\$	600	0.9	1,600
			5	\$	1,500	2.3	4,000
	HVAC Mini-Split/Ductless AC	<b>BES</b>	1	\$	200	0.9	356
	Programmable Thermostat - AC Only	<b>BES</b>	2	\$	50	0.0	374
			106	\$	2,650	10.3	19,822
	Programmable Thermostat - Elec Heat w/AC	<b>BES</b>	1	\$	25	0.1	2,272
			12	\$	300	0.0	27,264
	Programmable Thermostat - Geothermal	<b>BES</b>	1	\$	25	0.1	882
	Programmable Thermostat - Heat Pump	<b>BES</b>	2	\$	50	0.0	2,228
	Programmable Thermostat - NON Elec-Gas w/AC	<b>BES</b>	1	\$	25	0.0	187
	Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	<b>BES</b>	1	\$	125	0.3	935
			2	\$	50	0.2	374
				\$	<b>14,010</b>	<b>28.8</b>	<b>128,295</b>

<b>Comm Refrigeration</b>		LED Reach-in Refrigerated Case Ltg	<b>BES</b>	1	\$ 300	0.6	5,148
					<b>\$ 300</b>	<b>0.6</b>	<b>5,148</b>
<b>2012 Total</b>					<b>\$ 142,446</b>	<b>443.4</b>	<b>2,088,373</b>
<b>2013</b>	<b>CI HVAC</b>	ECM in Res Style Furnace	<b>BES</b>	1	\$ 300	0.5	800
				2	\$ 300	0.5	800
		Energy Recovery Ventilator (ERV)	<b>BES</b>	4	\$ 10,620	35.4	5,664
		Mini Split Ductless AC	<b>BES</b>	4	\$ 400	1.7	712
		Setback/Programmable Thermostats	<b>BES</b>	1	\$ 50	0.0	882
				5	\$ 250	0.0	4,110
		Unitary Air Cooled Split Sys AC <65k Btuh (1ph)	<b>BES</b>	1	\$ 125	0.2	207
		Unitary Single Pkgd AC 065k - 135k Btuh	<b>BES</b>	1	\$ 600	1.3	434
				3	\$ 1,800	3.8	1,786
					<b>\$ 14,445</b>	<b>43.2</b>	<b>15,395</b>
<b>Compressed Air System</b>		Compressed Air System Leak Survey	<b>BES</b>	1	\$ 924	14.2	124,021
		Cycling Refrigerated Dryers	<b>BES</b>	1	\$ 210	0.6	2,414
		VFD Air Compressor	<b>BES</b>	1	\$ 1,890	6.9	30,456
				2	\$ 3,710	13.6	59,784
					<b>\$ 6,734</b>	<b>35.3</b>	<b>216,675</b>
<b>Custom Electric Program</b>		Custom	<b>BES</b>	1	\$ 31,223	81.6	695,888
		Custom - 12-drop cold deck for injection equipment	<b>BES</b>	1	\$ 7,026	19.6	115,368
		Custom - 32-drop cold deck for injection equipment	<b>BES</b>	1	\$ 5,336	15.0	82,333
		Custom Lighting	<b>BES</b>	1	\$ 43,093	178.6	839,191
					<b>\$ 86,678</b>	<b>294.7</b>	<b>1,732,780</b>
<b>Energy Star Appliance</b>		Energy Star Clothes Washer	<b>BES</b>	1	\$ 100	0.0	262
				2	\$ 400	0.1	1,048
				3	\$ 150	0.1	393
		Energy Star Decorative Lights	<b>BES</b>	2	\$ 7	0.0	156
				6	\$ 21	0.0	469
		Energy Star Dehumidifier	<b>BES</b>	1	\$ 10	0.1	90
		Energy Star Dishwasher	<b>BES</b>	1	\$ 125	0.2	300
				2	\$ 100	0.1	240
		Energy Star Refrigerators	<b>BES</b>	1	\$ 100	0.1	810
				2	\$ 100	0.1	810
				3	\$ 150	0.1	1,215
				4	\$ 200	0.2	1,620
		Energy Star Room AC	<b>BES</b>	1	\$ 15	0.1	50
					<b>\$ 1,478</b>	<b>1.2</b>	<b>7,463</b>
<b>Food Service</b>		ES Comm Glass Door Freezers	<b>BES</b>	2	\$ 200	0.5	4,008
		ES Comm Solid Door Refrigerators	<b>BES</b>	2	\$ 300	0.2	1,580
		ES Ice Machines	<b>BES</b>	1	\$ 200	0.2	1,652
					<b>\$ 700</b>	<b>0.8</b>	<b>7,240</b>
<b>Lighting - New Const</b>		T5HO 4ft Hi Bay Fixture	<b>BES</b>	101	\$ 7,070	25.3	148,281
		T8 4ft Hi Bay Fixture	<b>BES</b>	54	\$ 2,700	8.1	49,811
				153	\$ 5,525	19.6	50,964
					<b>\$ 15,295</b>	<b>53.0</b>	<b>249,056</b>
<b>Lighting - Retrofit</b>		High Bay Flourescent Occ Sensors	<b>BES</b>	1	\$ 450	1.4	24,161
		LED & Induction Tech	<b>BES</b>	5	\$ 60	0.1	832

			70	\$	1,050	3.8	10,537
			302	\$	4,530	16.7	45,458
	Othr Eff Ltg Tech - per Unit	BES	25	\$	1,000	3.2	27,666
	Rducd Wtg T8 Lamps ONLY	BES	484	\$	484	1.9	5,604
			829	\$	829	3.3	9,599
	Reduced Wtg T8 4ft CEE Qual	BES	40	\$	720	2.8	7,764
			95	\$	1,638	5.0	11,789
			266	\$	4,644	10.8	30,637
	T8 4ft w/ Bal Repl 8ft T12 HO	BES	13	\$	260	0.8	2,081
	T8 4ft w/Elec Bal	BES	16	\$	208	0.6	1,744
			30	\$	390	1.2	4,915
			50	\$	650	2.0	5,449
			83	\$	1,079	3.3	24,275
			350	\$	3,990	9.4	57,711
			394	\$	3,435	7.4	18,508
	CFL Fixtures and Lamps	BES	48	\$	72	1.4	6,179
	T5HO Hi Bay Fixtures w/ 4ft Lamps	BES	99	\$	6,930	8.5	52,685
	T8 Hi Bay Fixtures w/ 4ft Lamps	BES	6	\$	510	1.3	8,195
			32	\$	2,720	5.4	15,375
			35	\$	2,975	7.8	18,418
			60	\$	5,100	9.9	69,438
				\$	43,724	108.2	459,020
Res HVAC	HVAC Air_Source HP - 14.5 SEER	BES	1	\$	250	0.2	1,581
	HVAC Central AC unit	BES	1	\$	100	0.8	450
			2	\$	400	2.8	1,527
			3	\$	900	7.2	3,948
			4	\$	400	3.0	1,614
			5	\$	500	4.0	2,198
	HVAC HE Furnace with ECM	BES	2	\$	600	0.9	1,600
			3	\$	900	1.4	2,400
			5	\$	1,500	2.3	4,000
			6	\$	900	1.4	2,400
			9	\$	1,350	2.1	3,600
			10	\$	1,500	2.3	4,000
	HVAC Mini Split_Ductless Air_Source HP	BES	1	\$	200	0.4	6,470
			2	\$	400	0.9	12,940
	HVAC Mini-Split/Ductless AC	BES	1	\$	200	0.9	356
	Programmable Thermostat - Elec Heat w/AC	BES	4	\$	100	0.4	9,088
			5	\$	125	0.5	11,360
	Programmable Thermostat - Propane, Fuel Oil, Boiler w/AC	BES	1	\$	75	0.3	561
			2	\$	100	0.4	748
			3	\$	75	0.3	561
			4	\$	100	0.4	748
			6	\$	150	0.6	1,122
				\$	10,825	33.4	73,272
VFDs and Pumps	Hi_Eff Pumps	BES	3	\$	400	0.9	3,186
	Variable Freq Drives	BES	2	\$	900	5.9	19,837
			3	\$	520	3.4	9,278

				\$	1,820	10.1	32,301
Comm Refrigeration	Anti_sweat heater control	BES	1	\$	47	0.2	9,156
	ECM Fan Motor for Cooler-Freezer	BES	15	\$	900	2.0	24,225
	LED Vertical Reach-in Refrigerated Case Lighting	BES	1	\$	150	0.3	2,574
				\$	1,097	2.5	35,955
2013 Total				\$	182,796	582.5	2,829,157
Grand Total				\$	786,822	2,399.2	11,657,995

## Appendix 2 – Watertown Resolution

### RESOLUTION NO. 6516

#### RESOLUTION PROVIDING FOR THE ADOPTION OF AN INTEGRATED RESOURCE PLAN (IRP) AS REQUIRED BY WESTERN AREA POWER ADMINISTRATION TO COMPLY WITH LONG-TERM POWER SUPPLY AGREEMENT

**WHEREAS** the Watertown Municipal Utilities Department purchases a significant portion of its power supply from the Western Area Power Administration (Western); and

**WHEREAS** Western has recently published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing an Integrated Resource Plan (IRP); and

**WHEREAS** the Municipal Utility staff has prepared an IRP Summary Report describing the IRP process used and the information and assumption used to develop the IRP; and

**WHEREAS** our customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and

**WHEREAS** any public comments received have been addressed in order to strengthen the Utility's Integrated Resource Plan; and

**WHEREAS** the IRP Summary Report included 5-year and 2-year action plans outlining actions to be taken by the Municipal Utilities Department during the next several years

**NOW THEREFORE BE IT RESOLVED** by the Watertown Municipal Utilities Department as follows:

That the "Integrated Resource Plan Summary Report for the Watertown Municipal Utilities Department dated September 1, 2014 shall be approved for filing with Western under the Energy Planning and Management Program"

Dated at Watertown, South Dakota, this 30<sup>th</sup> Day of June 2014

WATERTOWN MUNICIPAL UTILITIES

  
Michael V. Luken, President  
Watertown Municipal Utilities

ATTEST:

  
Lisa Pahl, Secretary  
Watertown Municipal Utilities

(SEAL)

## **IX. Winner, SD Resource Planning**

### **A. *City Information***

Winner, located in Tripp County, is a community of more than 2,800 individuals located in south central South Dakota. The residential sector included 1,547 housing units, and the median age of the population is 45.6 years. About 24.6% of the population is 65 years of age or older and about 21.4% are under 18 years old. In 2012, the municipal utility had 1,436 residential customers and 486 commercial customers. The residential sector's yearly usage averaged 12,540 kWh per customer in 2012. Commercial customers averaged 44,093 kWh.

The rates for each type of customer are shown on the rate sheet in Exhibit 1. As of January 2014, the residential sector was charged 9.7 cents per kWh, and received a fixed customer charge of \$12.30. Small commercial customers were charged 10 cents per kWh, and received a fixed customer charge of \$17.50. Large commercial customers were charged 5.1 cents per kWh, and received a fixed customer charge of \$32.00. Large commercial customers also received a demand charge of \$11.25 per kW.

Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4, which show the winter and summer peak demand and energy for 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Winner on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively. The total peak load, including distribution and transformation losses, was 9,421 kW in the winter and 8,646 kW in the summer. Exhibits 7 and 8 each show the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load remaining flat from midnight to 6 am then increasing till roughly 9 am. Then loads begin to decline until 4 pm with a quick upswing until 6 pm. Loads then fall again until 12 am the next day. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline occurs until 6 am the next day.

## Exhibit 1

### WINNER, SOUTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$12.30
	\$/kWh	\$.097
Small Commercial	Customer Charge	\$17.50
	\$/kWh	\$.100
Large Commercial	Customer Charge	\$32.00
	\$/kW	\$11.25
	\$/kWh	\$.051

## Exhibit 2

MRES Seasonal Load Report  
 Winner, SD  
 Town Gate Load  
 BASE Forecast

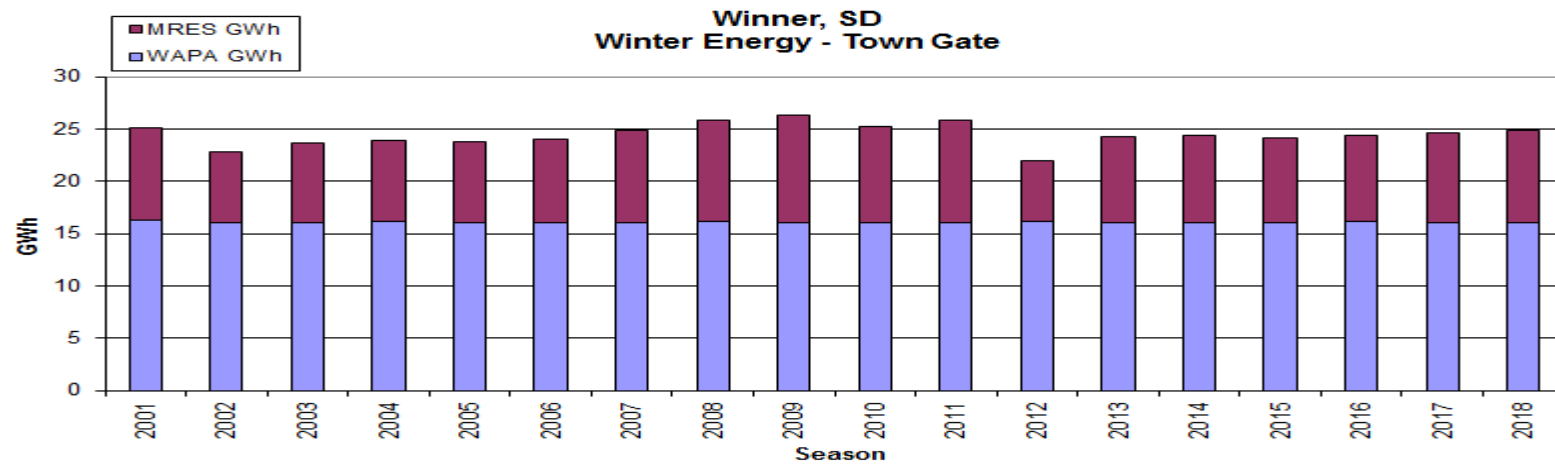
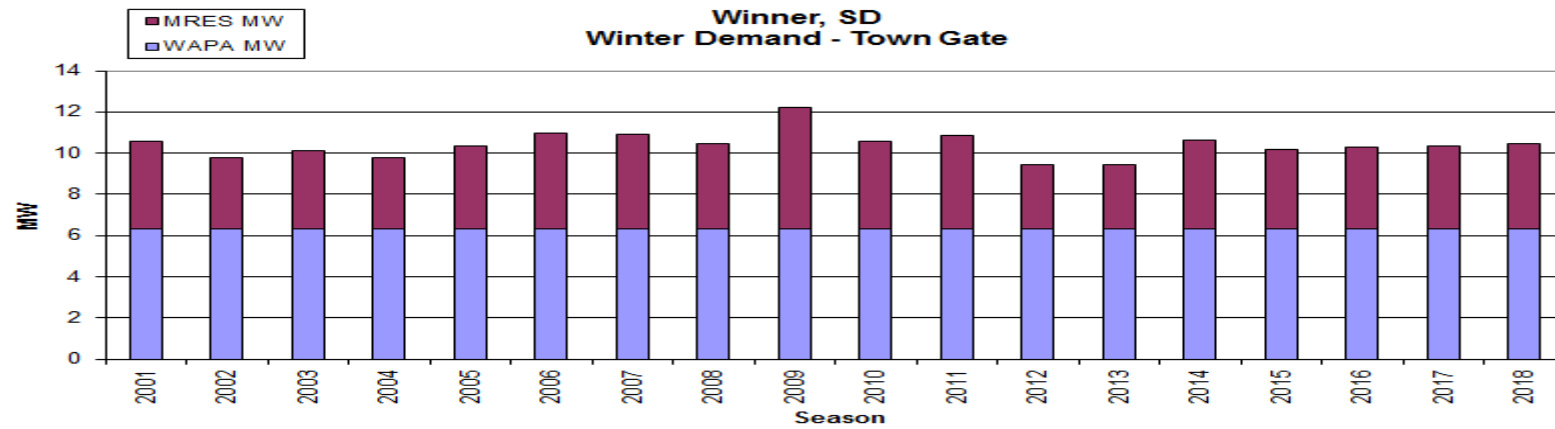
1/31/14 2:14 PM  
 Town Gate Load  
 Monthly Splits

Historic Through 12/2013

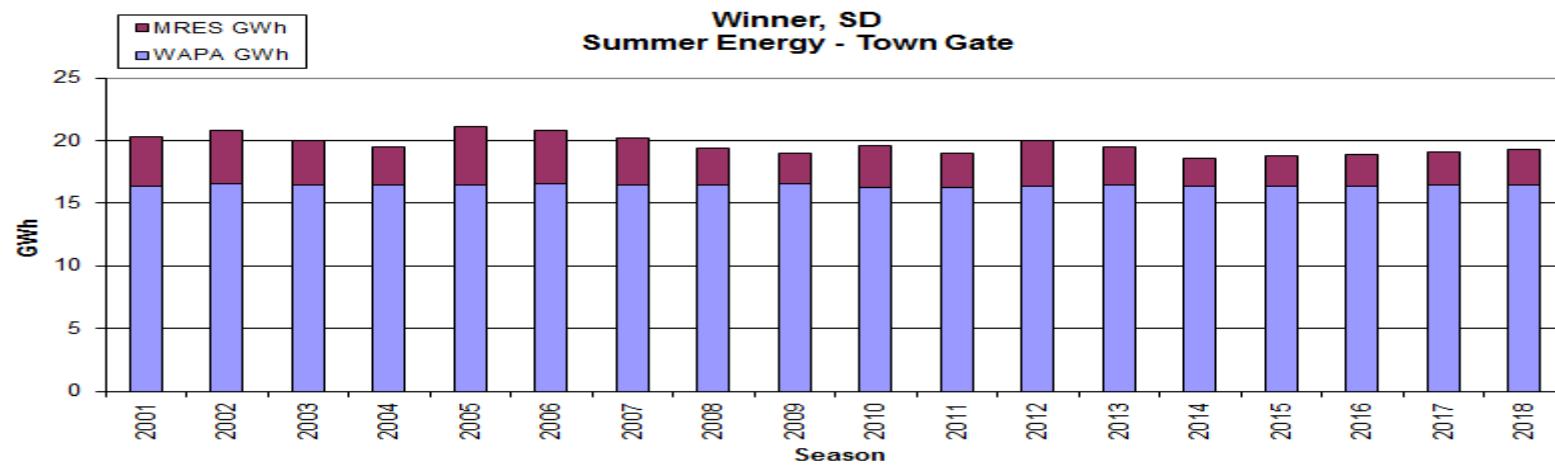
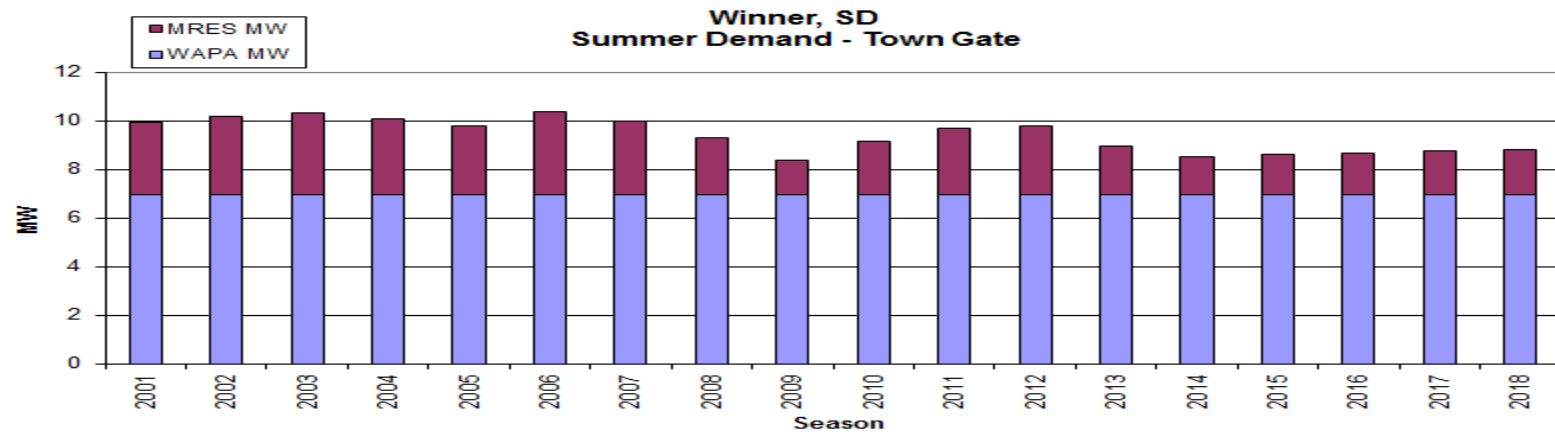
Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	9,438	6,972	2,965	0	2001	20,294,324	16,390,957	3,903,367	0
2002	9,324	6,972	3,214	0	2002	20,845,382	16,544,000	4,301,382	0
2003	9,452	6,972	3,342	0	2003	20,034,778	16,439,514	3,595,264	0
2004	9,203	6,972	3,093	0	2004	19,467,820	16,399,251	3,068,569	0
2005	9,411	6,972	2,810	0	2005	21,065,357	16,484,442	4,580,915	0
2006	9,528	6,961	3,428	0	2006	20,845,901	16,517,000	4,328,901	0
2007	9,138	6,961	3,038	0	2007	20,168,698	16,411,293	3,757,405	0
2008	8,422	6,961	2,322	0	2008	19,409,759	16,490,262	2,919,497	0
2009	7,710	6,961	1,402	0	2009	18,933,350	16,517,000	2,416,350	0
2010	8,281	6,961	2,181	0	2010	19,539,707	16,219,452	3,320,255	0
2011	8,813	6,961	2,713	0	2011	18,988,819	16,216,686	2,772,133	0
2012	8,937	6,961	2,837	0	2012	20,027,693	16,365,674	3,662,019	0
2013	8,646	6,961	1,994	0	2013	19,485,763	16,466,339	3,019,424	0
2014	7,912	6,961	1,567	0	2014	18,568,869	16,338,194	2,230,675	0
2015	7,988	6,961	1,641	0	2015	18,747,920	16,367,316	2,380,604	0
2016	8,065	6,961	1,715	0	2016	18,927,003	16,396,444	2,530,559	0
2017	8,141	6,961	1,789	0	2017	19,106,119	16,425,576	2,680,543	0
2018	8,217	6,961	1,863	0	2018	19,285,269	16,454,715	2,830,554	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	9,162	6,348	3,430	0	2002	22,776,078	16,058,000	6,718,078	0
2003	9,497	6,348	3,765	0	2003	23,647,853	16,058,000	7,589,853	0
2004	9,805	6,348	3,457	0	2004	23,938,502	16,160,000	7,778,502	0
2005	9,628	6,348	4,005	0	2005	23,823,417	16,058,000	7,765,417	0
2006	10,081	6,334	4,634	0	2006	24,055,488	16,035,000	8,020,488	0
2007	10,289	6,334	4,569	0	2007	24,856,588	16,024,000	8,832,588	0
2008	10,309	6,334	4,143	0	2008	25,882,157	16,126,000	9,756,157	0
2009	11,294	6,334	5,859	0	2009	26,361,332	16,024,000	10,337,332	0
2010	10,496	6,334	4,263	0	2010	25,280,812	16,024,000	9,256,812	0
2011	10,299	6,334	4,492	0	2011	25,834,637	16,024,000	9,810,637	0
2012	9,158	6,334	3,098	0	2012	21,999,859	16,126,000	5,873,859	0
2013	9,421	6,334	3,087	0	2013	24,298,839	16,024,000	8,274,839	0
2014	9,701	6,334	4,266	0	2014	24,379,976	16,024,000	8,355,976	0
2015	9,714	6,334	3,845	0	2015	24,164,868	16,024,000	8,140,868	0
2016	9,807	6,334	3,934	0	2016	24,396,456	16,126,142	8,270,314	0
2017	9,899	6,334	4,024	0	2017	24,628,084	16,024,000	8,604,084	0
2018	9,992	6,334	4,113	0	2018	24,859,755	16,024,000	8,835,755	0



### Exhibit 3

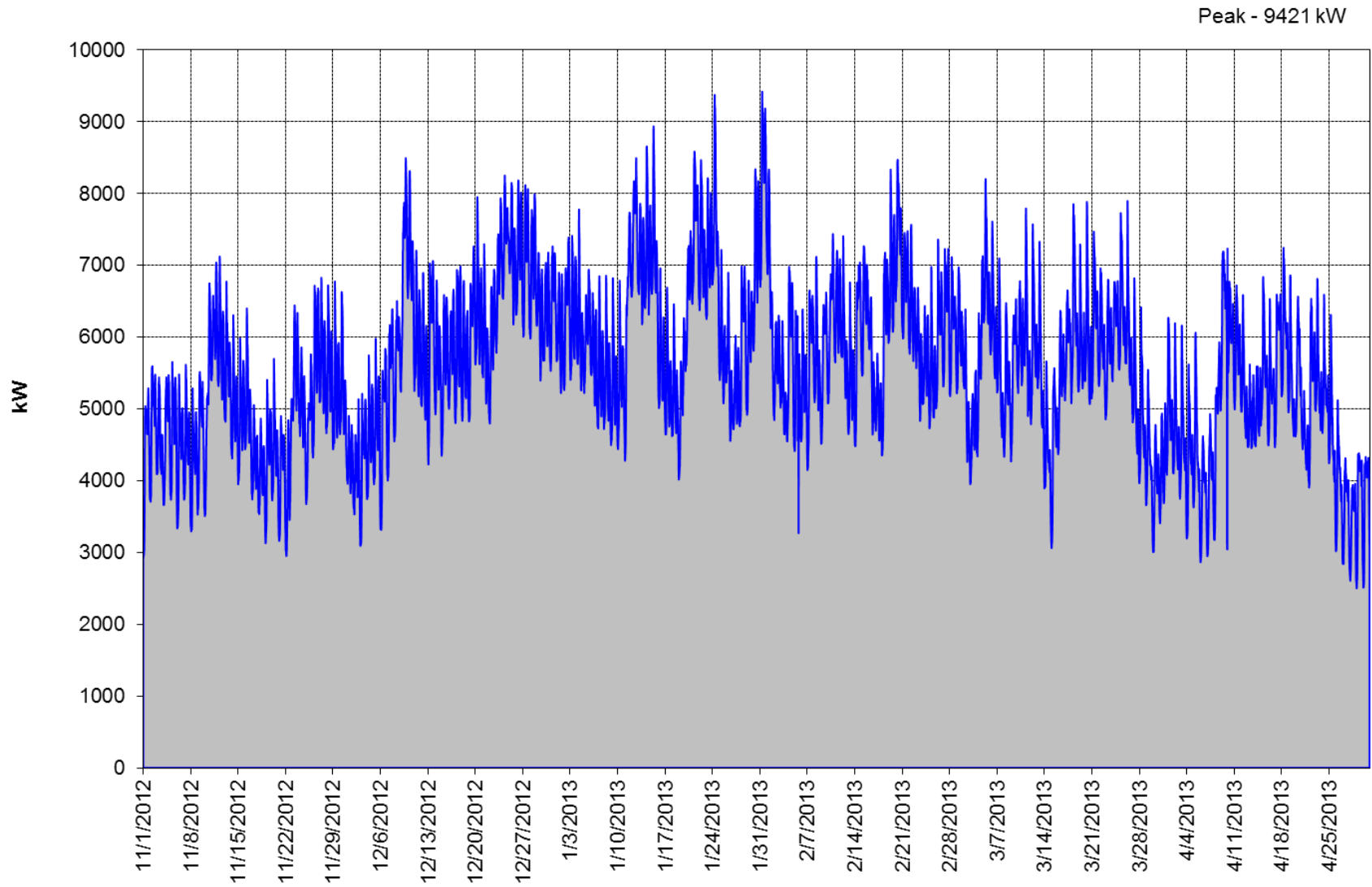


## Exhibit 4



## Exhibit 5

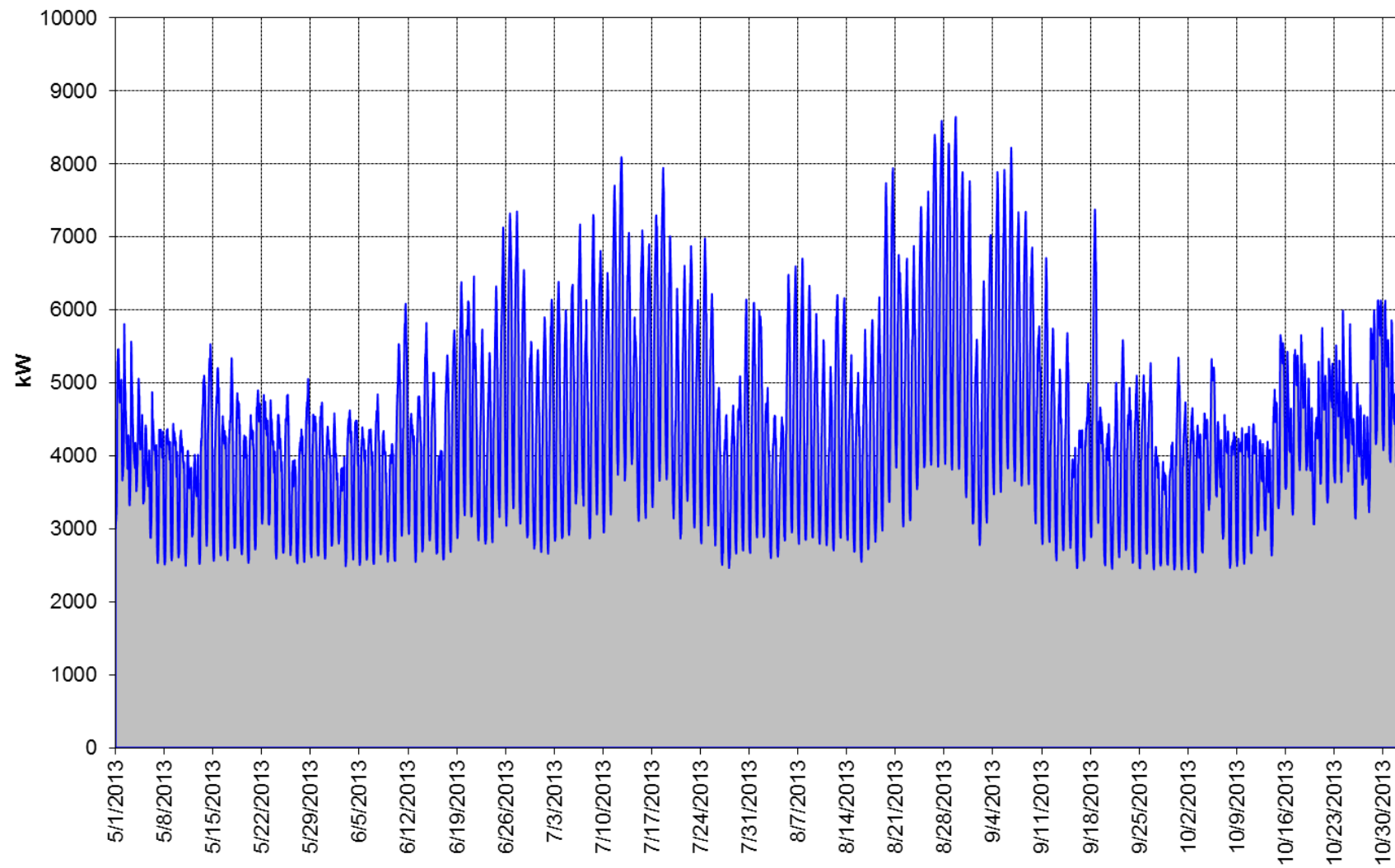
### Winner, SD Winter 2012-2013 Half-Hour Load Shape - Town Gate



## Exhibit 6

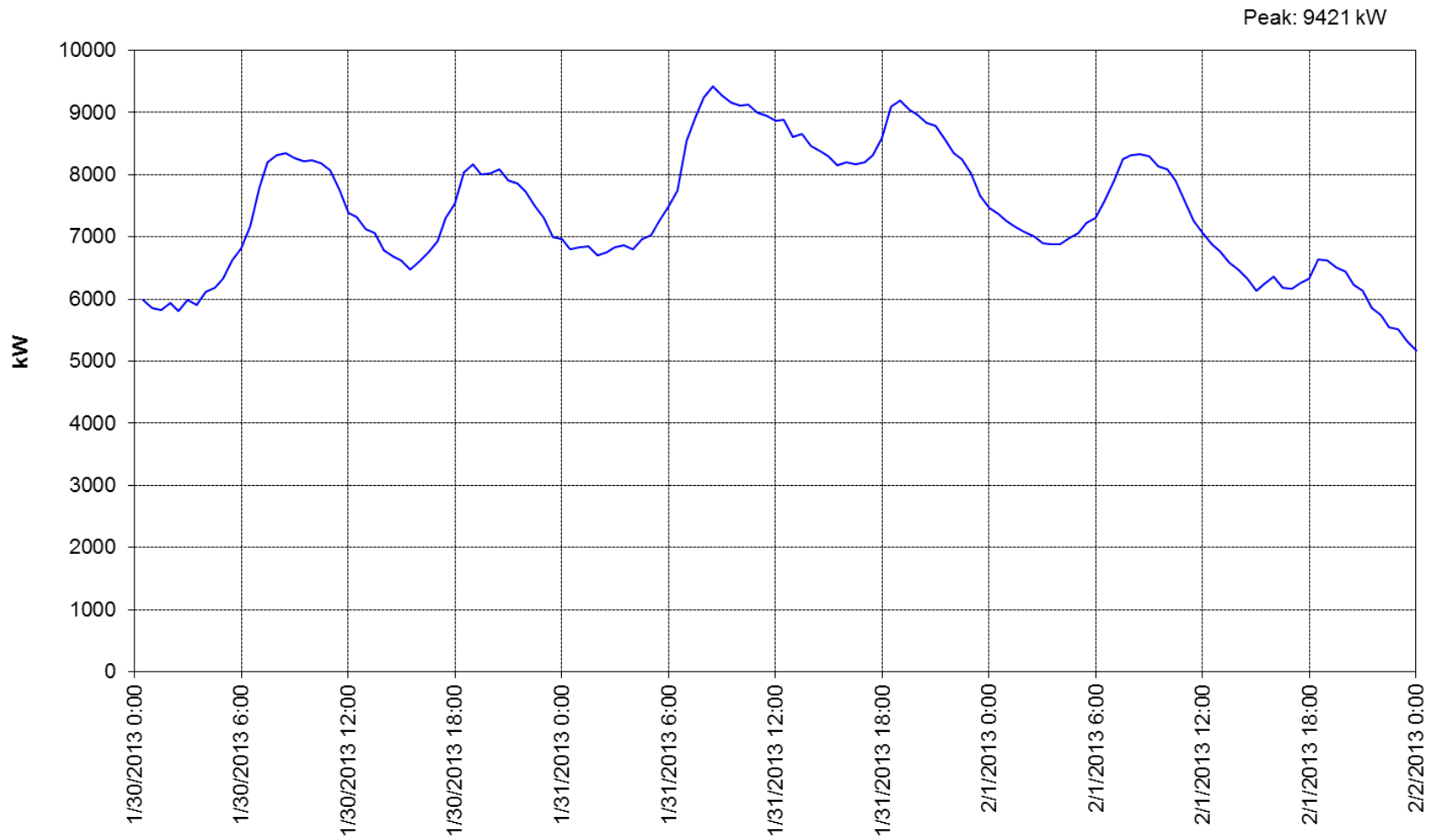
### Winner, SD Summer 2013 Half-Hour Load Shape - Town Gate

Peak - 8646 kW



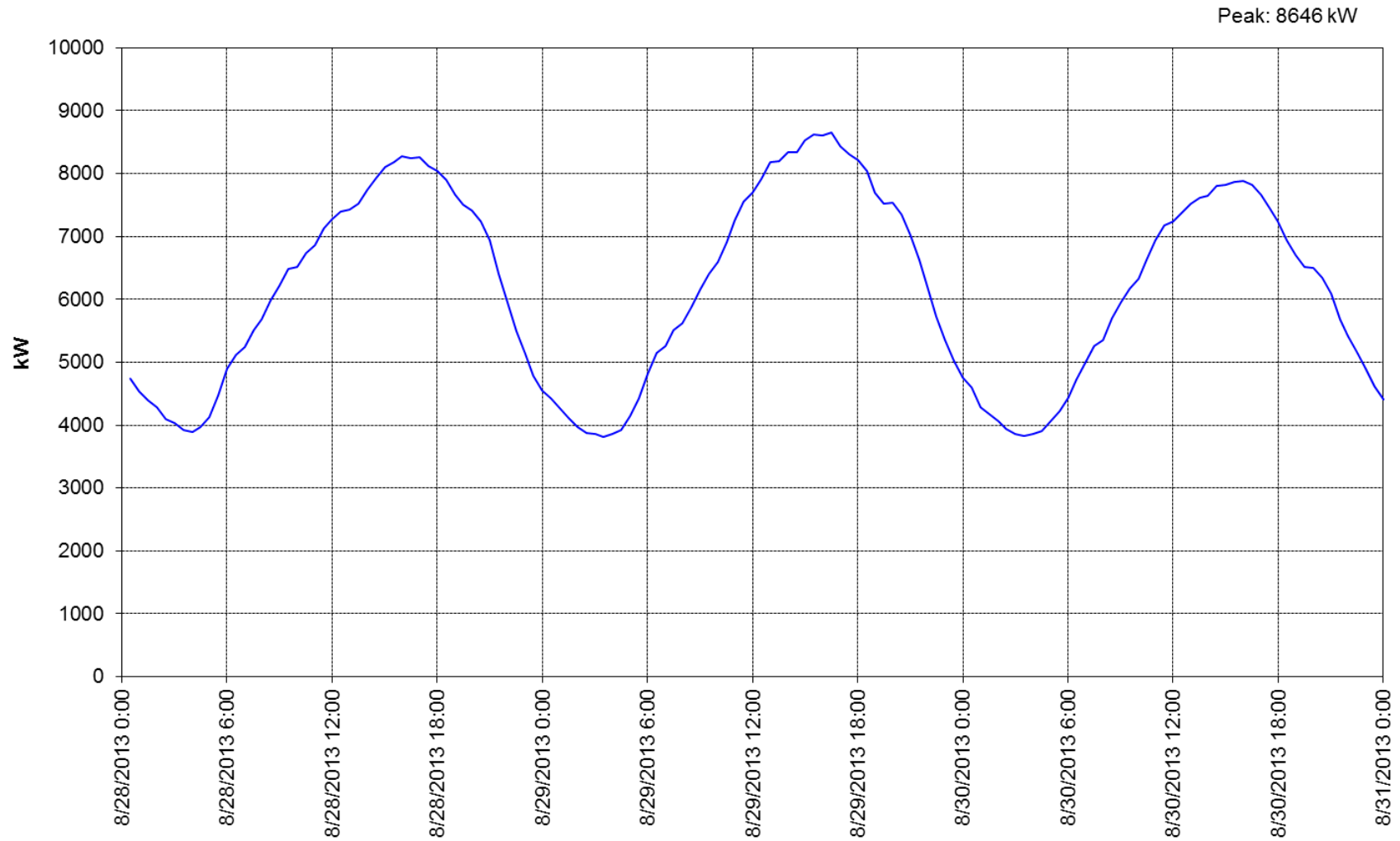
## Exhibit 7

Winner, SD Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate



## Exhibit 8

Winner, SD Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Winner is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Winner to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Winner has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.

## Exhibit 9 - Summary of DSM Activities 2009-2013

Year	Program	BES or City	Quan	Incentive	kW	kWh
2009	Lighting	BES	832	\$ 1,311	3.5	42,296
		City		\$ -	150.0	547,500
	Res Lighting	BES	1	\$ 402	1.1	13,400
<b>2009 Total</b>			<b>833</b>	<b>\$ 1,713</b>	<b>154.6</b>	<b>603,196</b>
2010	CI HVAC	BES	2	\$ 2,125	0.6	37,670
	Energy Star Appliance	BES	39	\$ 1,177	0.4	5,424
	Lighting - Retrofit	BES	140	\$ 1,245	2.5	6,674
<b>2010 Total</b>			<b>181</b>	<b>\$ 4,547</b>	<b>3.5</b>	<b>49,768</b>
2011	Energy Star Appliance	BES	8	\$ 350	0.1	1,624
	Res Lighting	BES	582	\$ 873	2.3	22,597
<b>2011 Total</b>			<b>590</b>	<b>\$ 1,223</b>	<b>2.5</b>	<b>24,221</b>
2012	Energy Star Appliance	BES	2	\$ 100	0.0	450
	Lighting - Retrofit	BES	49	\$ 2,315	5.3	16,843
<b>2012 Total</b>			<b>51</b>	<b>\$ 2,415</b>	<b>5.3</b>	<b>17,293</b>
2013	Energy Star Appliance	BES	32	\$ 1,335	1.1	6,252
	Lighting - Retrofit	BES	131	\$ 3,077	5.2	24,072
	Res HVAC	BES	2	\$ 1,125	1.1	23,156
<b>2013 Total</b>			<b>165</b>	<b>\$ 5,537</b>	<b>7.4</b>	<b>53,480</b>
<b>Grand Total</b>			<b>1820</b>	<b>\$ 15,435</b>	<b>173.2</b>	<b>747,958</b>

- Load Management Program**

Description: Load management control boxes are on all electric water heaters, central air conditioners, and electric space heaters. The load management program began in 2011, and has been ramping up since that time.

Energy Savings:

2011: 28 kW on peak  
 2012: 244 kW on peak  
 2013: 300 kW on peak

Cost:

2011: \$94,874  
 2012: \$64,258  
 2013: \$77,781



## ***D. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Winner was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

## ***E. Options Chosen – Development of Action Plan***

DSMware software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or is planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

### ***i. Future Actions***

It is assumed that Winner will continue to participate in the Bright Energy Solutions program. Winner would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Winner will participate in all of the Bright Energy Solutions programs to the extent possible. This assumption was made only to obtain more realistic expectations for the five-year plan, and is certainly not considered to be a cap on participation in the event that the program attracts more participants than anticipated.

Representatives from Winner plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, Winner is successfully operating their own Load Management program, and it is unknown if they will participate in the MRES Coordinated Demand Response (CDR) program in the future. Winner will continue to evaluate that decision in the years to come.

### ***ii. Milestones***

As part of the annual WAPA IRP updates, Winner will evaluate the progress on these programs. The success will be measured against this 5-year plan, with

adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

#### ***F. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

#### ***G. Public Participation***

A preliminary draft of this report was produced on April 23, 2014. This draft was reviewed by Electrical Superintendent Myles McIntyre. A revised draft was completed on July 15, 2014. A notice of public hearing on IRP was published in the local newspaper on July 23 and July 30, 2014. The public hearing on the IRP was held at the August 4, 2014 City Council meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The City Council approved the resolution on August 4, 2014. A copy of the approved resolution is included in Appendix 2.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b>4/23/2014</b>
Preliminary Draft Reviewed By	<b>5/21/2014</b>
Draft Revision Completion Date	<b>7/15/2014</b>
Date Published in Paper	<b>7/23/2014</b>
Public Hearing Date	<b>8/4/2014</b>
Date Approved by City Council	<b>8/4/2014</b>

## Appendix 1 – Detailed DSM Measures Installed

Utility	Winner								
Year	Program	Measure	BES or City	Quan	Incentive	kW	kWh		
2009	Lighting	15W CFL	BES	826	\$ 1,311	3.3	41,300		
		LED exit sign	BES	6		0.2	996		
		Street Lights	City	(blank)	\$ -	150.0	547,500		
	Res Lighting	268 CFL bulbs	BES	1	\$ 1,311	153.5	589,796		
					\$ 402	1.1	13,400		
					\$ 402	1.1	13,400		
2009 Total				\$ 1,713	154.6	603,196			
2010	CI HVAC	GS HP_Closed Loop Water to Air	BES	2	\$ 2,125	0.6	37,670		
	Energy Star Appliance	Energy Star Clothes Washer	BES		\$ 2,125	0.6	37,670		
				1	\$ 150	0.1	675		
				2	\$ 100	0.0	450		
				3	\$ 150	0.1	675		
				4	\$ 200	0.1	900		
				7	\$ 350	0.2	1,575		
				Energy Star Decorative Lights	BES	6	\$ 42	0.0	102
				Energy Star Dehumidifier	BES	1	\$ 10	0.0	88
				Energy Star Dishwasher	BES	1	\$ 100	0.0	548
						3	\$ 75	0.0	411
	Lighting - Retrofit	Ltng Retrofit _Flrscnt T8 & T5 w/Elec Bal	BES	140	\$ 1,177	0.4	5,424		
					\$ 1,245	2.5	6,674		
					\$ 1,245	2.5	6,674		
	2010 Total				\$ 4,547	3.5	49,768		
2011	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 100	0.0	450		
				2	\$ 200	0.1	900		
				Energy Star Dishwasher	BES	1	\$ 50	0.0	274
	Res Lighting	CFL Fixtures and Lamps	BES	582	\$ 350	0.1	1,624		
					\$ 873	2.3	22,597		
					\$ 873	2.3	22,597		
2011 Total				\$ 1,223	2.5	24,221			
2012	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 100	0.0	450		
					\$ 100	0.0	450		
	Lighting - Retrofit	Ltng Retro _ Flrscnt T8 & T5 w/Elec Bal	BES	23	\$ 405	1.3	3,939		
		Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	26	\$ 1,910	4.0	12,904		
				\$ 2,315	5.3	16,843			
2012 Total				\$ 2,415	5.3	17,293			
2013	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 250	0.1	655		
				2	\$ 200	0.1	524		
				3	\$ 150	0.1	393		
		Energy Star Dehumidifier	BES	1	\$ 10	0.1	90		
		Energy Star Dishwasher	BES	1	\$ 100	0.1	240		
				2	\$ 50	0.1	120		
				3	\$ 75	0.1	180		

	Energy Star Refrigerators	BES	1	\$	350	0.3	2,835
			3	\$	150	0.1	1,215
				\$	<b>1,335</b>	<b>1.1</b>	<b>6,252</b>
Lighting - Retrofit	T8 4ft w/Elec Bal	BES	68	\$	863	2.2	7,987
	T8 8ft w/Elec Bal	BES	36	\$	324	0.6	1,716
	T5HO Hi Bay Fixtures w/ 4ft Lamps	BES	27	\$	1,890	2.3	14,369
				\$	<b>3,077</b>	<b>5.2</b>	<b>24,072</b>
Res HVAC	HVAC Closed Loop Water to Air GS HP	BES	1	\$	1,100	1.0	22,274
	Programmable Thermostat - Geothermal	BES	1	\$	25	0.1	882
				\$	<b>1,125</b>	<b>1.1</b>	<b>23,156</b>
<b>2013 Total</b>				\$	<b>5,537</b>	<b>7.4</b>	<b>53,480</b>
<b>Grand Total</b>				\$	<b>15,435</b>	<b>173.2</b>	<b>747,958</b>

## Appendix 2 – Winner Resolution

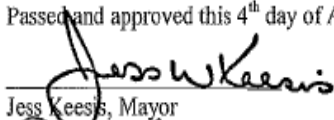
### RESOLUTION

- WHEREAS,** the City of Winner purchases a significant portion of its power supply from the Western Area Power Administration (Western); and
- WHEREAS,** Western has recently published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing of an Integrated Resource Plan (IRP); and
- WHEREAS,** the municipal utility staff has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and
- WHEREAS,** our customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and
- WHEREAS,** any public comments received have been addressed in order to strengthen the city's Integrated Resource Plan; and
- WHEREAS,** the IRP Summary Report included 5-year and 2-year action plans outlining actions to be taken by the Municipal utility during the next several years

**NOW THEREFORE BE IT RESOLVED BY** the City of Winner City Council as follows:

That the "Integrated Resource Plan Summary Report for the City of Winner dated September 2014 shall be approved for filing with Western under the Energy Planning and Management Program."

Passed and approved this 4<sup>th</sup> day of August, 2014.

  
Jess Keess, Mayor

  
Rhonda Augspurger, Finance Officer

## **X. Valley City, ND Resource Planning**

### **A. *City Information***

Valley City, located in Barnes County, is a community of more than 6,500 individuals located in southeastern North Dakota. The residential sector included 3,307 housing units, and the median age of the population is 42.1 years. About 22% of the population is 65 years of age or older and about 18.7% percent are under 18 years old. In 2012, the municipal utility had 3,299 residential customers, 783 commercial customers, and one industrial customer. The residential sector's yearly usage averaged 12,731 kWh per customer in 2012. Commercial customers averaged 66,842 kWh, and the single industrial customer consumed 6,706,000 kWh.

The rates for each type of customer are shown on the rate sheet in the appendix. Exhibit 2 contains the numerical values used to generate the seasonal graphs in Exhibits 3 and 4, which show the winter and summer peak demand and energy for 2001 through 2018 with forecasted values after 2013, respectively. Exhibits 5 and 6 show the total power purchases of Valley City on a half hour basis, for the 2012-2013 winter season and the 2013 summer season, respectively.

The total peak load, including distribution and transformation losses, was 22,473 kW in the winter and 18,525 kW in the summer. Exhibits 7 and 8 each show the peak day (along with the day before and the day after) for those two seasons. The winter peak graph shows the load remaining mostly flat throughout the three day period due to load control. The summer peak graph indicates the load increasing from 6 am until peaking at 5 pm. Then a steady decline occurs until 6 am the next day.

## Exhibit 1

### VALLEY CITY, NORTH DAKOTA CURRENT RETAIL ELECTRIC RATE SCHEDULE

Customer Class	Rate Component	Current Rate
Residential	Customer Charge	\$15.57
	\$/kWh - First 1000 kWh	\$.0650
	\$/kWh - After First 1000 kWh	\$.0488
Small Commercial - Single Phase	Customer Charge	\$20.78
	\$/kWh Jun-Aug	\$.0813
	\$/kWh Sep-May	\$.0488
Small Commercial - Three Phase	Customer Charge	\$62.54
	\$/kWh Jun-Aug	\$.0813
	\$/kWh Sep-May	\$.0488
Large Commercial	Customer Charge	\$62.54
	\$/kW	\$12.60
	\$/kWh	\$.0238



## Exhibit 2

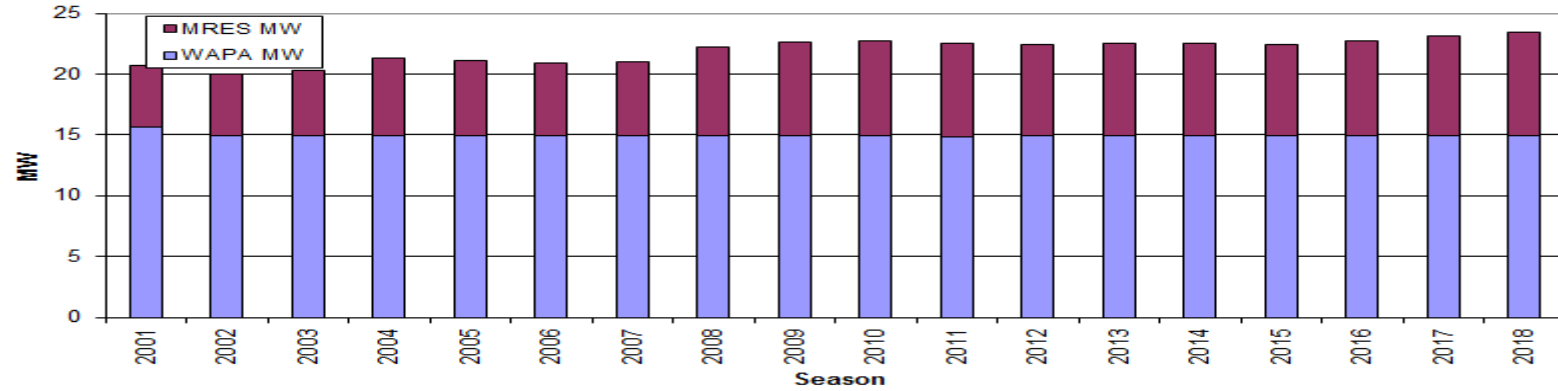
MRES Seasonal Load Report  
Valley City, ND  
Town Gate Load  
BASE Forecast

1/31/14 2:14 PM  
Town Gate Load  
Monthly Splits  
Historic Through 12/2013

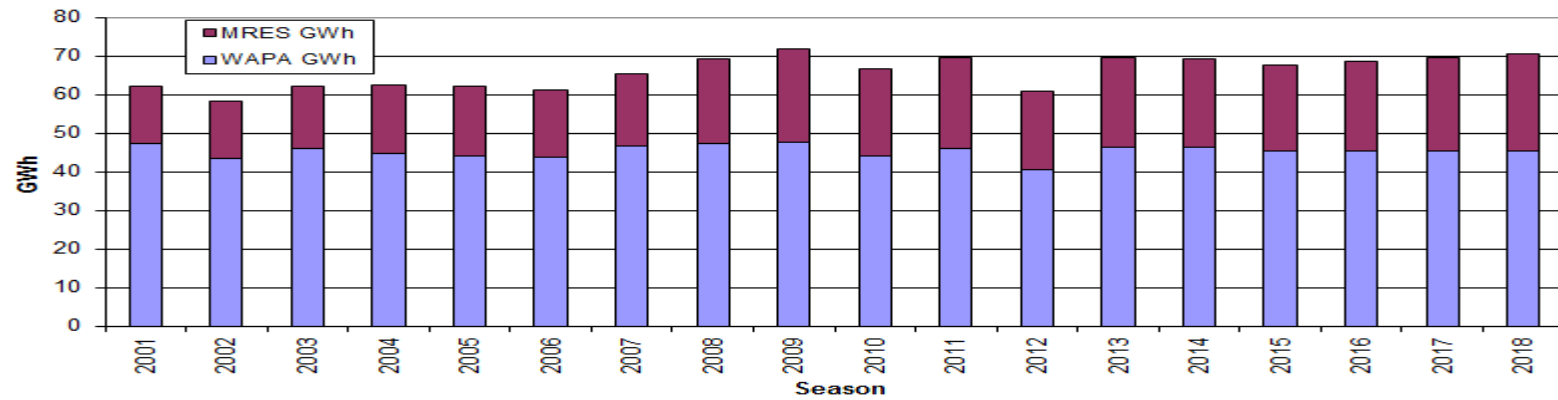
Demand (kW)					Energy (kWh)				
Summer	Total	WAPA	MRES	Other	Summer	Total	WAPA	MRES	Other
2001	17,721	11,232	6,489	0	2001	41,535,000	27,113,789	14,421,211	0
2002	17,295	11,232	6,270	0	2002	43,538,400	27,873,935	15,664,465	0
2003	18,534	11,232	7,302	0	2003	42,039,060	26,357,790	15,681,270	0
2004	17,145	10,390	6,755	0	2004	41,533,800	25,874,670	15,659,130	0
2005	18,327	11,232	7,095	0	2005	44,343,600	27,617,444	16,726,156	0
2006	17,655	10,962	6,852	0	2006	45,544,800	28,221,033	17,323,767	0
2007	19,278	11,214	8,064	0	2007	45,030,600	26,923,503	18,107,097	0
2008	17,133	11,075	6,981	0	2008	44,908,800	27,530,287	17,378,513	0
2009	17,973	11,214	6,759	0	2009	45,001,200	28,741,842	16,259,358	0
2010	17,865	11,147	6,718	0	2010	44,836,200	28,029,071	16,807,129	0
2011	18,264	11,214	7,050	0	2011	44,987,400	27,818,395	17,169,005	0
2012	18,390	11,214	7,176	0	2012	46,325,400	28,308,321	18,017,079	0
2013	18,525	11,214	7,311	0	2013	46,260,000	28,104,232	18,155,768	0
2014	17,353	11,202	6,151	0	2014	44,575,090	28,785,809	15,789,281	0
2015	17,485	11,214	6,271	0	2015	44,914,472	28,913,583	16,000,889	0
2016	17,766	11,214	6,552	0	2016	45,637,310	29,034,087	16,603,223	0
2017	18,017	11,214	6,803	0	2017	46,281,223	29,006,032	17,275,191	0
2018	18,276	11,214	7,062	0	2018	46,947,066	29,009,866	17,937,200	0
Demand (kW)					Energy (kWh)				
Winter	Total	WAPA	MRES	Other	Winter	Total	WAPA	MRES	Other
2002	19,800	14,949	5,019	0	2002	58,077,600	43,540,778	14,536,822	0
2003	20,274	14,976	5,298	0	2003	61,949,400	46,114,990	15,834,410	0
2004	21,270	14,976	6,294	0	2004	62,541,000	44,764,309	17,776,691	0
2005	20,931	14,920	6,194	0	2005	62,140,800	44,072,393	18,068,407	0
2006	20,919	14,967	5,952	0	2006	61,062,600	43,640,839	17,421,761	0
2007	21,045	14,944	6,101	0	2007	65,375,400	46,528,375	18,847,025	0
2008	22,245	14,944	7,301	0	2008	69,264,000	47,412,399	21,851,601	0
2009	22,647	14,944	7,703	0	2009	71,761,200	47,559,079	24,202,121	0
2010	22,713	14,944	7,769	0	2010	66,678,000	43,888,502	22,789,498	0
2011	22,395	14,862	7,613	0	2011	69,666,600	46,104,696	23,561,904	0
2012	22,374	14,930	7,444	0	2012	60,874,200	40,638,188	20,236,012	0
2013	22,473	14,944	7,529	0	2013	69,369,600	46,196,344	23,173,256	0
2014	22,557	14,944	7,613	0	2014	69,217,006	46,141,410	23,075,596	0
2015	22,409	14,944	7,465	0	2015	67,557,797	45,170,667	22,387,130	0
2016	22,769	14,944	7,825	0	2016	68,448,669	45,171,026	23,277,643	0
2017	23,091	14,944	8,147	0	2017	69,460,736	45,170,527	24,290,209	0
2018	23,423	14,944	8,479	0	2018	70,453,481	45,170,261	25,283,220	0

### Exhibit 3

Valley City, ND  
Winter Demand - Town Gate

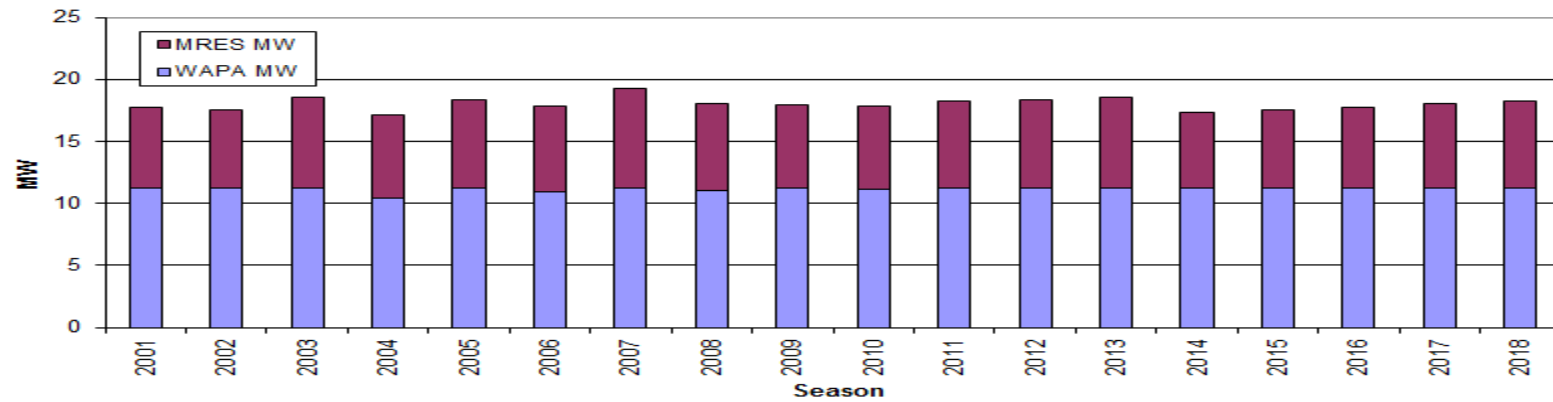


Valley City, ND  
Winter Energy - Town Gate

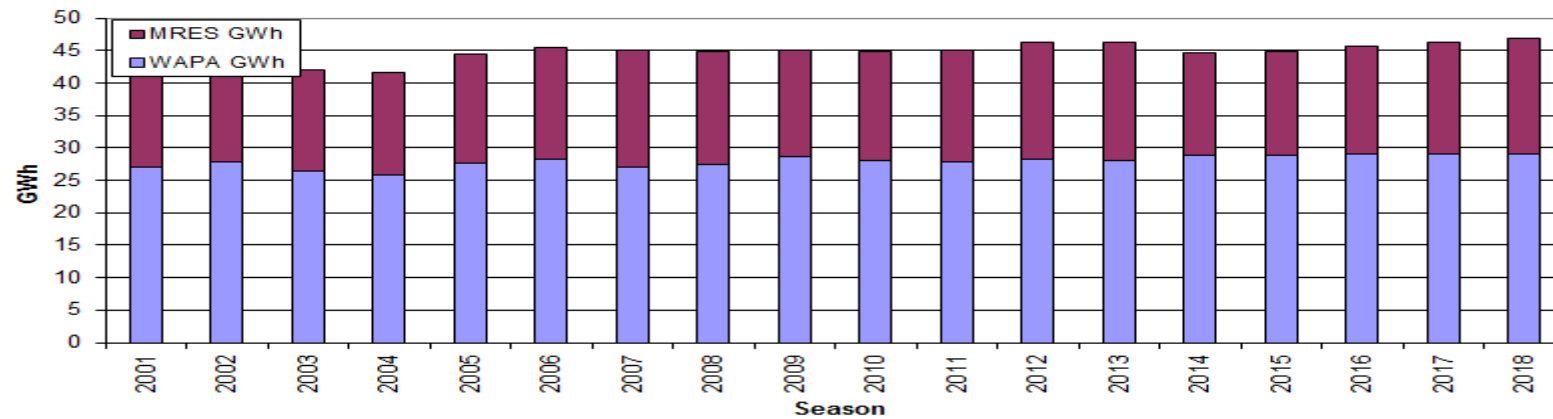


## Exhibit 4

### Valley City, ND Summer Demand - Town Gate

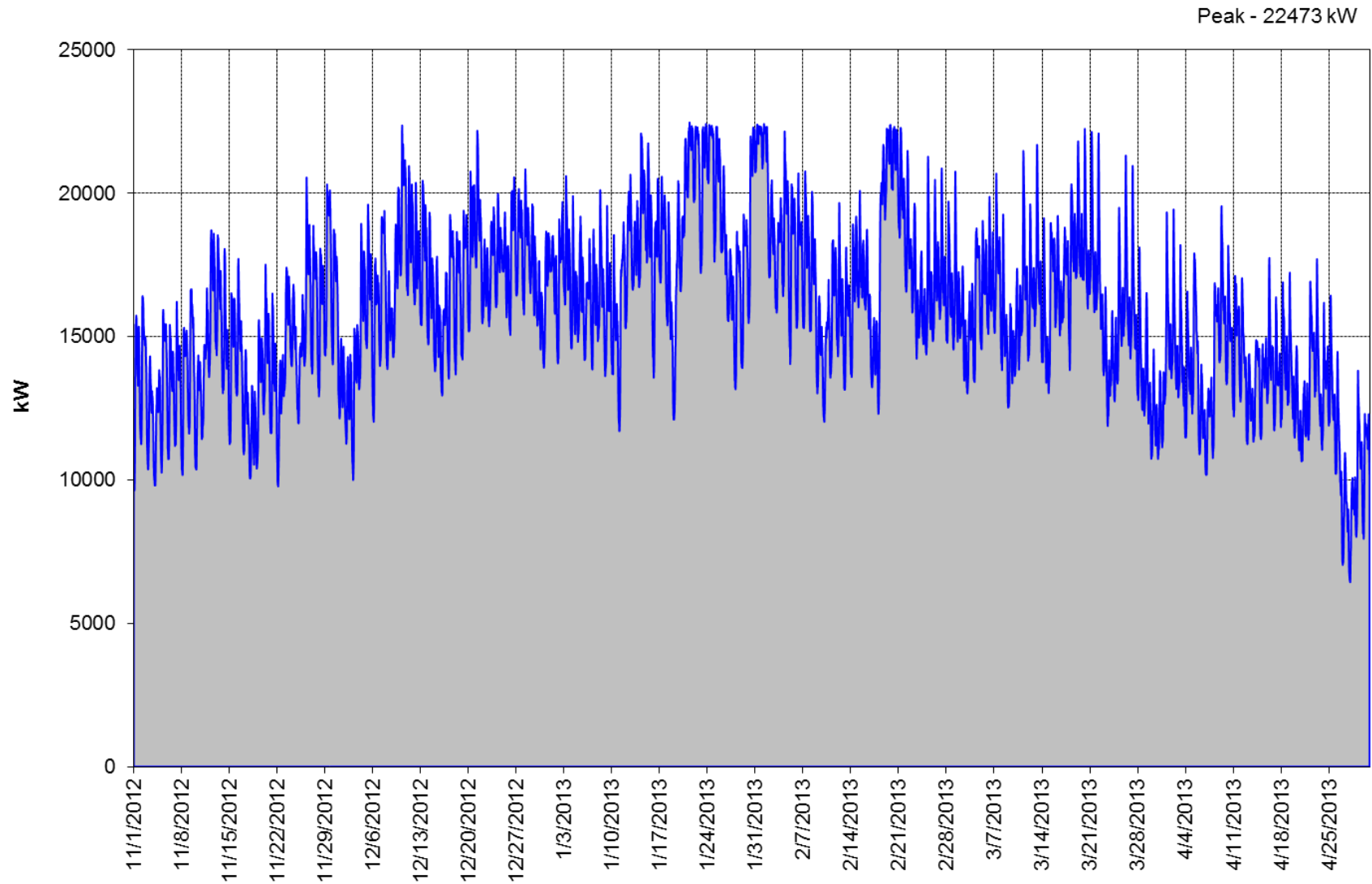


### Valley City, ND Summer Energy - Town Gate



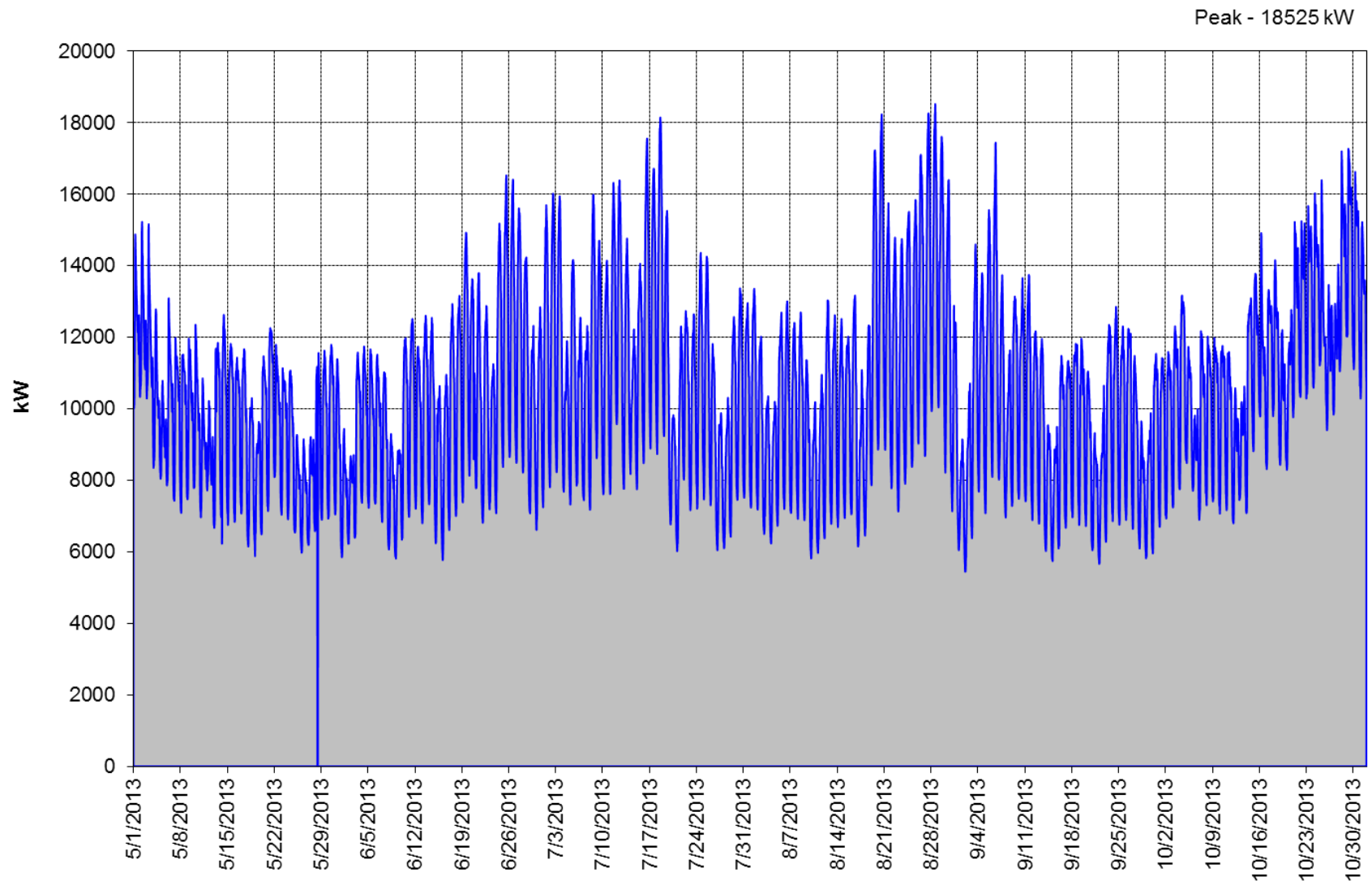
## Exhibit 5

### Valley City, ND Winter 2012-2013 Half-Hour Load Shape - Town Gate



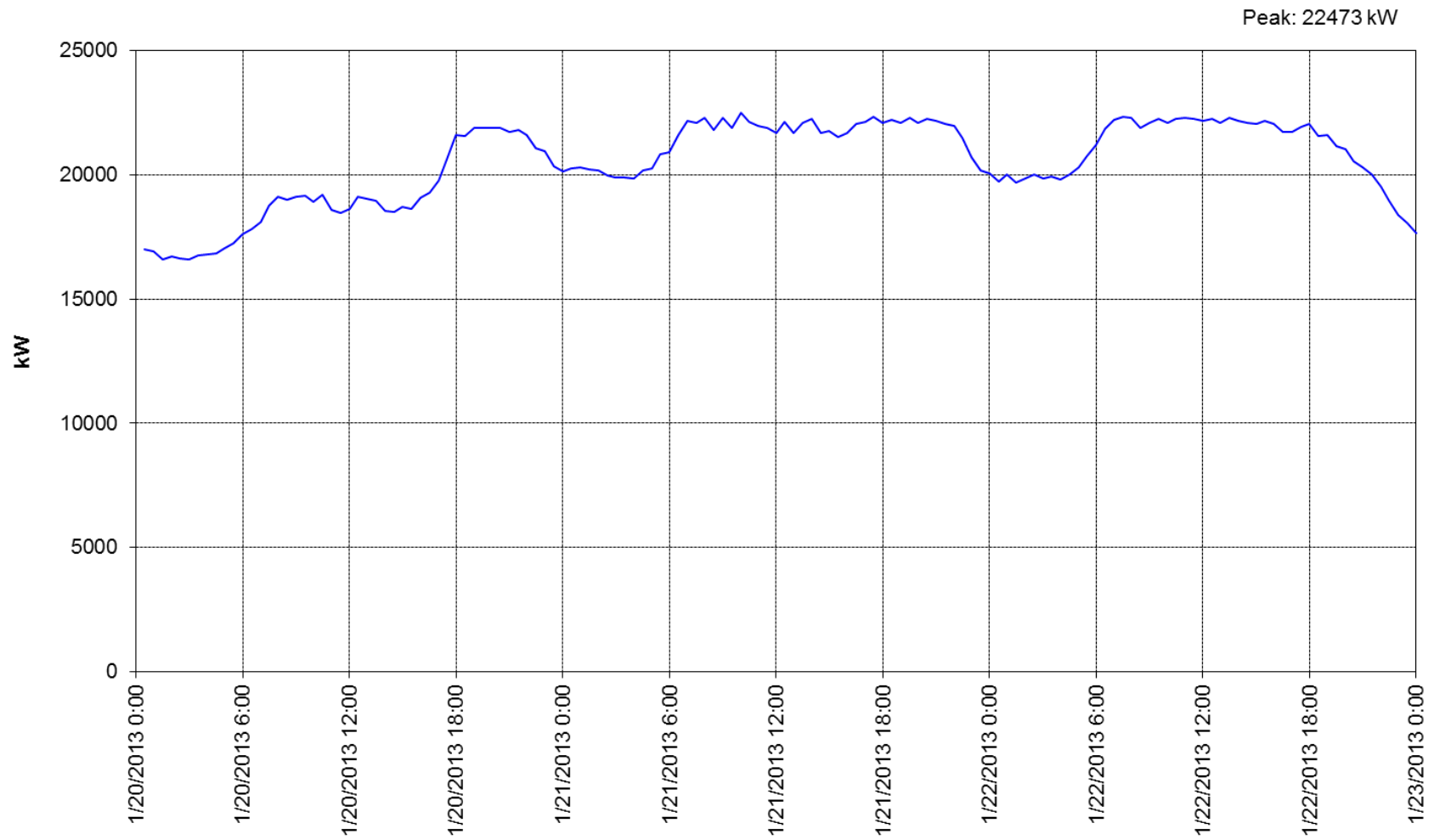
## Exhibit 6

Valley City, ND Summer 2013 Half-Hour Load Shape - Town Gate



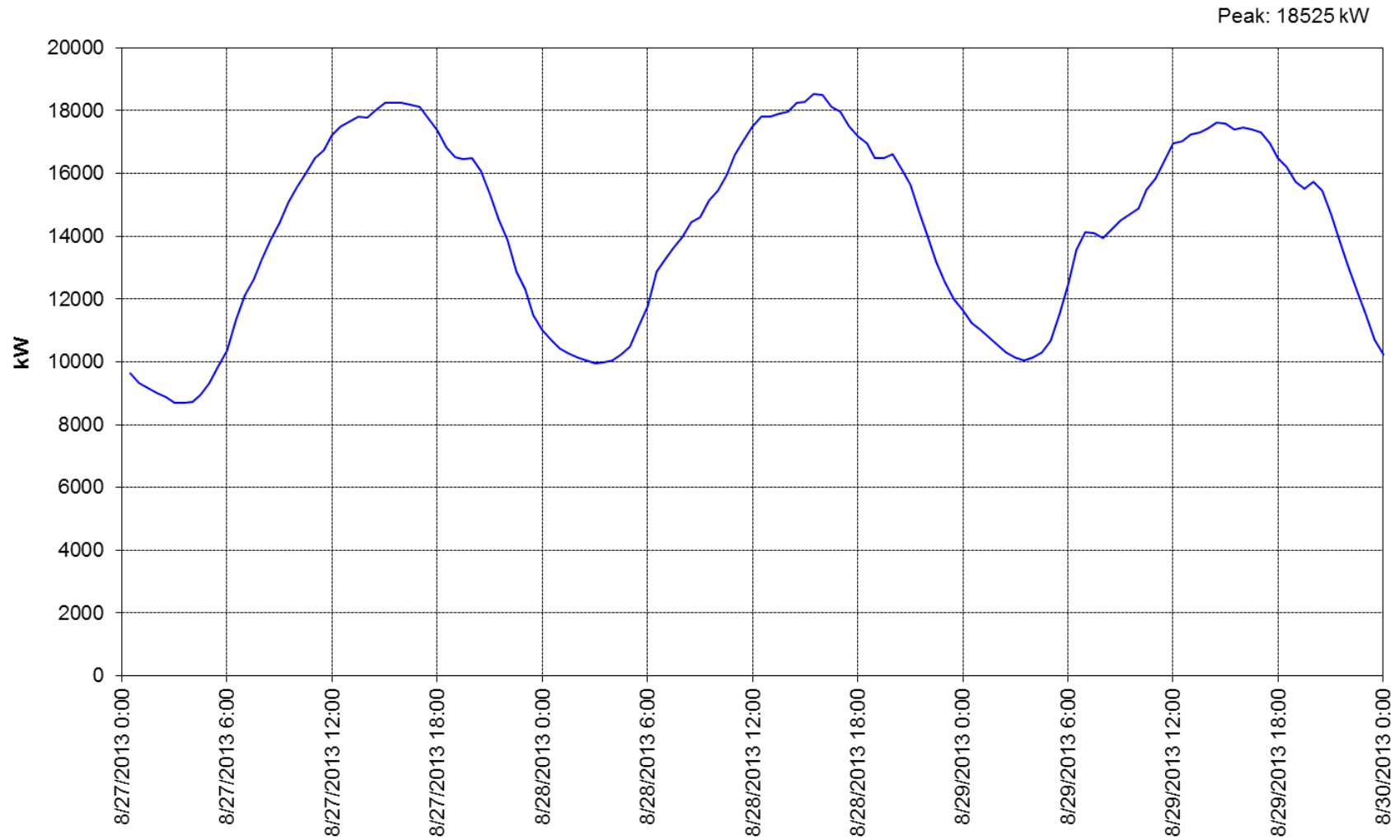
## Exhibit 7

### Valley City, ND Peak Half-Hour Load Shape, Winter 2012-2013, Town Gate



## Exhibit 8

Valley City, ND Peak Half-Hour Load Shape, Summer 2013, Town Gate



## ***B. Supply-side Efforts***

As explained in the section detailing MRES Resource Planning activities, MRES conducts all supply-side resource planning for its members. MRES studied traditional, as well as renewable, energy sources in its resource plan.

All supplemental power for Valley City is supplied through its joint S-1 agreement with other MRES members. All MRES resources are used to supply all of its S-1 members as a group. Therefore, it is neither possible nor necessary for Valley City to individually study supply-side resources as part of this IRP.

## ***C. Historic DSM Efforts***

Valley City has been active in pursuing new DSM programs, and participates in the Bright Energy Solutions (BES) Program through MRES. The BES Program offerings (as seen in Schedule A on page 15), were developed after considering the major markets, the saturation of electric and gas appliances, and the characteristics of the customers. The information was analyzed to determine both the technical and cost-saving potential of energy management improvements, any barriers that might be encountered to implementing the improvements, the realistic expectation for program participation, and any net savings that would result from the programs.

The table shown in Exhibit 9 below is a summary of the DSM activities that were installed between 2009 and 2013. The first column indicates the year of installation. The second column indicates the program category. The third column indicates whether the measure was a part of the BES program that was incentivized by MRES, or a program that the city conducted without MRES assistance. The fourth column shows the number of measures installed. The fifth column shows the total incentives paid by MRES. The last two columns show the kW and kWh saved on an annual basis by the new installations. For more detailed information showing exact types of measures installed, please see the Appendix 1 at the end of this section.



## Exhibit 9 - Summary of DSM Activities 2009-2013

Program	BES or City	Quan	Incentive	kW	kWh
⊖ Custom Electric Program	BES	3	\$ 6,163	20.5	186,226
⊖ Energy Star Appliance	BES	19	\$ 545	0.3	2,876
⊖ Lighting - Retrofit	BES	391	\$ 6,870	18.0	47,246
⊖ Res HVAC	BES	2	\$ 400	0.9	12,940
		<b>415</b>	<b>\$ 13,978</b>	<b>39.7</b>	<b>249,288</b>
⊖ CI HVAC	BES	9	\$ 5,050	4.1	78,518
⊖ Energy Star Appliance	BES	26	\$ 1,070	0.8	6,145
⊖ Food Service	BES	1	\$ 600	2.0	17,800
⊖ Lighting - New Const	BES	20	\$ 1,000	3.8	21,460
⊖ Lighting - Retrofit	BES	2496	\$ 13,887	55.6	228,765
⊖ Res HVAC	BES	2	\$ 400	0.5	2,984
		<b>2554</b>	<b>\$ 22,007</b>	<b>66.8</b>	<b>355,672</b>
⊖ Comm Refrigeration Audit	BES	4	\$ -	0.9	8,117
⊖ Compressed Air System	BES	1	\$ 517	2.4	16,629
⊖ Custom Electric Program	BES	2	\$ 2,373	7.9	33,545
⊖ Energy Star Appliance	BES	17	\$ 775	0.5	5,361
⊖ Lighting - New Const	BES	80	\$ 4,760	30.5	128,394
⊖ Lighting - Retrofit	BES	1215	\$ 28,180	95.3	426,462
⊖ Res HVAC	BES	2	\$ 275	0.2	2,695
		<b>1321</b>	<b>\$ 36,880</b>	<b>137.8</b>	<b>621,203</b>
⊖ CI HVAC	BES	3	\$ 8,448	17.9	51,243
⊖ Compressed Air System	BES	1	\$ 82	2.7	4,581
⊖ Custom Electric Program	BES	3	\$ 34,579	109.1	343,727
⊖ Energy Star Appliance	BES	26	\$ 978	0.9	6,521
⊖ Food Service	BES	4	\$ 515	1.0	5,520
⊖ Lighting - New Const	BES	155	\$ 7,750	30.2	60,476
⊖ Lighting - Retrofit	BES	1693	\$ 23,994	93.8	482,861
⊖ Res HVAC	BES	2	\$ 225	0.5	7,584
		<b>1887</b>	<b>\$ 76,569</b>	<b>256.0</b>	<b>962,513</b>
		<b>6177</b>	<b>\$ 149,435</b>	<b>500.3</b>	<b>2,188,676</b>

- **Load Management System**

Description: The load management system consists of a supervisory control and data acquisition system (SCADA) and a radio system. The SCADA system is composed of a master station and remote terminal unit at each monitoring site to monitor the total load and manage interruptible loads through radio control. The radio control system consists of a central transmitter and numerous receivers. Interruptible loads provide the opportunity to reduce total capacity needs, and push energy consumption to off-peak hours. The interruptible loads include 276 dual-fuel heating systems, 350 water heaters, and other miscellaneous loads. The utility will control any load that the customer is willing to have controlled.

The load management system is marketed through the use of interruptible rates. Interruptible rates consist of billing adjustments or credits that may apply to one or more rate schedules. The type of billing adjustment varies with the type of interruptible load; such as water heater credit, energy credit, and demand credit. Interruptible rates promote the efficient use of electrical energy by shifting energy use to times with lower demand without increasing the need for more capacity.

Energy Savings: 7,000 kW on-peak during winter months

Cost: \$33,000 in 2010

\$40,000 in 2011

\$23,000 in 2012

\$44,645 in 2013

#### ***D. Evaluation of Alternatives***

As explained in the section detailing MRES Resource Planning activities, PA Consulting performed a DSM Potential Study for MRES and its members. In this study, many different DSM measures were evaluated for technical, market and economic potential. The measures that were found to be feasible were further evaluated and developed by the DSM Task Force which was comprised of representatives from MRES member communities. The Task Force made recommendations on which programs would be included and the amount of incentives that MRES would pay to the members for each measure. Once this list of programs and incentives was made available by MRES, Valley City was free to choose from the list of Bright Energy Solutions programs and incentives, or to pursue other measures on their own and without any incentives from MRES.

#### ***E. Options Chosen – Development of Action Plan***

DSM software was run on each individual measure, and then grouped into programs that MRES is either currently offering (Phase I) or is planning to offer within the next five years (Phase II) as a part of Bright Energy Solutions.

*i. Future Actions*

It is assumed that Valley City will continue to participate in the Bright Energy Solutions program. Valley City would have virtually no out-of-pocket costs, as MRES will be paying the incentives for all of these programs. It is planned that Valley City will participate in all of the Bright Energy Solutions programs to the extent possible.

Representatives from Valley City plan to utilize the MRES marketing materials for all the programs made available in the Bright Energy Solutions program, and take advantage of MRES assistance when possible, and will be working closely with their assigned MRES field representative.

At this time, Valley City is successfully operating their own Load Management program, and they are in process of changing over to the MRES Coordinated Demand Response (CDR) program. The overall participation and load reduction amounts are anticipated to be approximately the same as before.

With the installation of the new AMI system Valley City intends to expand our winter load control program to the summer months. By expanding our control months Valley City hopes to reduce our overall summer peaking load by 1-2 MW.

In 2014 Valley City is working with MRES to “sign-up” new renewable distributive Generation sites with the city. These are solar plants that are attached to homes or commercial properties.

*ii. Milestones*

As part of the annual WAPA IRP updates, Valley City will evaluate the progress on these programs. The success will be measured against this 5-year plan, with adjustments made for actual customer participation, and any changes or additions to the Bright Energy Solutions programs.

Measurement and validation of the Bright Energy Solutions programs will be ongoing. Quality control, measurement of savings, verification tracking, and program evaluation are important components of a successful DSM program and they are critical to MRES if DSM is to be relied upon as a power resource. Approximately 5% of the annual MRES DSM budget has been set aside for evaluation, monitoring, and verification efforts. For verification purposes, all incentive applications receive a calculation review. An engineering review of savings calculations is conducted on all installations with \$10,000 or more in total incentives and on all custom projects, except for custom lighting. Field inspections are completed on a minimum of 5% of all installations and on 100% of installations over \$10,000 in total incentives and on 100% of custom projects.

For custom projects, MRES requires detailed estimates of kW and kWh savings that will be achieved as a result of the project, along with the sources and references for all values used. This may include certification of savings calculations by a qualified engineer. For projects with estimated savings larger than 1,000,000 kWh per year, or for projects involving new technology, MRES may require that energy savings be verified through metering or energy testing of kW and kWh before and after installation of the proposed equipment.

***F. Environmental Effects***

The environmental benefits of the DSM programs were not calculated specifically. However, any program that decreases energy consumption will, by definition, decrease the amount of energy generated. Given that a majority of generation is from non-renewable sources, DSM programs will serve to decrease emissions. Additionally, DSM programs that reduce electric demand will mean fewer new generation facilities will need to be constructed in the future.

***G. Public Participation***

A preliminary draft of this report was produced on April 15, 2014. A notice of public hearing on IRP was published in the local newspaper on August 6<sup>th</sup> & 13<sup>th</sup>, 2014. The public hearing on the IRP was held at the August 19, 2014 Board of City Commissioners meeting. A summary of any comments and responses made during the meeting are included in the Appendix. The Board of City Commissioners approved the resolution on August 19, 2014. A copy of the approved resolution is included in Appendix 2.

<i>IRP Approval Process</i>	
Preliminary Draft Date	<b><i>4/15/2014</i></b>
	<b><i>8/6/2014</i></b> <b><i>&amp;</i></b>
Date Published in Paper	<b><i>8/13/2014</i></b>
Public Hearing Date	<b><i>8/19/2014</i></b>
Date Approved by City Council	<b><i>8/19/2014</i></b>

## Appendix 1 – Detailed DSM Measures Installed

Utility	Valley City
---------	-------------

			BES or City	Quan	Incentive	kW	kWh
Year	Program	Measure					
2010	Custom Electric Program	replaced 32 300 watt with 16ea. 6 lamp T-8	BES	1	\$ 1,790	6.0	10,742
		replaced 41 300 watt w 16 4 lamp T-8	BES	1	\$ 2,148	7.2	154,660
		Replaced 116 8' 2 lamp T12 w 116 8' 2 lamp	BES	1	\$ 2,225	7.4	20,824
					\$ 6,163	20.5	186,226
	Energy Star Appliance	Energy Star Clothes Washer	BES	1	\$ 50	0.0	225
				6	\$ 300	0.1	1,350
		Energy Star Dehumidifier	BES	7	\$ 70	0.1	616
		Energy Star Dishwasher	BES	1	\$ 25	0.0	137
				4	\$ 100	0.0	548
					\$ 545	0.3	2,876
	Lighting - Retrofit	Ltng Retrofit _ CFL Fixtures & Lamps	BES	8	\$ 12	0.4	1,171
				80	\$ 120	4.4	10,491
		Ltng Retrofit _ Flrsct T8 & T5 w/Elec Bal	BES	39	\$ 381	1.2	3,317
		Ltng Retrofit _ T8 Hi Bay Fixtures w-Elec Bal	BES	24	\$ 2,040	5.4	12,800
		Ltng Retrofit _ Rducd Wtg T8 CEE Qual	BES	151	\$ 2,266	4.0	12,975
		Ltng Retrofit _ Hi Perf T8 CEE Qual	BES	10	\$ 105	0.3	715
				64	\$ 896	1.1	2,660
		Ltng Retrofit _ T5HO Hi Bay Fixtures w-Elec Bal	BES	15	\$ 1,050	1.3	3,117
					\$ 6,870	18.0	47,246
	Res HVAC	HVAC Mini Split_Ductless Air_Source HP	BES	2	\$ 400	0.9	12,940
					\$ 400	0.9	12,940
2010 Total					\$ 13,978	39.7	249,288
2011	CI HVAC	Desuperheater	BES	1	\$ 250	0.4	1,221
		GS HP_Closed Loop Water to Air	BES	1	\$ 1,250	0.3	18,835
		GS HP_Closed Loop Water to Water	BES	3	\$ 3,350	2.1	55,174
		Setback Thermostats	BES	1	\$ 50	0.3	822
			3	\$ 150	1.0	2,466	
				\$ 5,050	4.1	78,518	
	Energy Star Appliance	Energy Star Clothes Washer	BES	4	\$ 200	0.1	900
				7	\$ 350	0.2	1,575
		Energy Star Dishwasher	BES	1	\$ 25	0.0	137
				2	\$ 100	0.0	548
		Energy Star Refrigerators	BES	3	\$ 150	0.1	1,215
				4	\$ 200	0.2	1,620
		Energy Star Room AC	BES	1	\$ 15	0.1	50
				2	\$ 30	0.2	100
				\$ 1,070	0.8	6,145	
	Food Service	ES Comm Dishwasher _Electric	BES	1	\$ 600	2.0	17,800
					\$ 600	2.0	17,800
	Lighting - New Const	Ltng NC T8 4ft Hi Bay Fixture	BES	20	\$ 1,000	3.8	21,460

					\$ 1,000	3.8	21,460
Lighting - Retrofit	Ltng Retro _ CFL Fixtures & Lamps	BES	8	\$	12	0.4	1,587
			120	\$	180	5.8	25,957
	Ltng Retro _ Hi Perf T8 CEE Qual	BES	29	\$	364	1.6	5,757
			86	\$	694	2.6	11,621
			90	\$	1,162	5.0	15,017
	Ltng Retro _ Hi Perf T8 Replacing Specific Fixtures	BES	30	\$	900	3.0	8,174
	Ltng Retro _ Rducd Wtg Flr T8 Lamps	BES	1366	\$	683	5.2	23,364
	Ltng Retro _ Rducd Wtg T8 CEE Qual	BES	506	\$	6,327	21.8	98,216
	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES	8	\$	680	1.8	4,413
	Ltng Retro _ Flrsct T8 & T5 w/Elec Bal	BES	14	\$	70	0.0	476
			25	\$	125	0.3	1,509
			45	\$	512	1.7	6,256
			169	\$	2,178	6.4	26,418
					\$ 13,887	55.6	228,765
Res HVAC	HVAC Central AC unit	BES	1	\$	100	0.2	154
	HVAC HP Water Heater	BES	1	\$	300	0.3	2,830
					\$ 400	0.5	2,984
2011 Total				\$	22,007	66.8	355,672
2012	Comm Refrigeration						
	Audit	BES	2	\$	-	0.8	7,295
	LED Screw-in Replacement Lamp	BES	2	\$	-	0.1	822
					\$ -	0.9	8,117
	Compressed Air System						
	Compressed Air System Leak Survey	BES	1	\$	517	2.4	16,629
					\$ 517	2.4	16,629
	Custom Electric Program						
	35 300 W incandescent fixtures to 18 total 6 lamp F32-T8 High Bay	BES	1	\$	1,951	6.5	28,409
	Replace (11) T8 fixtures and (11) w (10) 3-lamp T8	BES	1	\$	422	1.4	5,136
					\$ 2,373	7.9	33,545
	Energy Star Appliance						
	Energy Star Clothes Washer	BES	1	\$	200	0.1	900
	Energy Star Dishwasher	BES	1	\$	75	0.0	411
	Energy Star Refrigerators	BES	1	\$	150	0.1	1,215
			3	\$	150	0.1	1,215
			4	\$	200	0.2	1,620
					\$ 775	0.5	5,361
Lighting - New Const	Ltng NC _ T8 4ft Hi Bay Fixture	BES	38	\$	2,660	15.4	79,063
			42	\$	2,100	15.1	49,331
					\$ 4,760	30.5	128,394
Lighting - Retrofit	Ltng Retro _ CFL Fixtures & Lamps	BES	4	\$	6	0.2	656
			5	\$	24	0.3	934
			12	\$	18	0.6	1,757
			64	\$	96	3.3	20,726
	Ltng Retro _ CFL Reflector Flood	BES	7	\$	28	0.4	1,468
	Ltng Retro _ Flrsct T8 & T5 w/Elec Bal	BES	1	\$	13	0.0	73
			46	\$	889	3.7	27,227
			62	\$	1,142	3.2	11,474
	Ltng Retro _ Hi Perf T8 CEE Qual	BES	57	\$	448	1.9	5,170
			302	\$	2,918	10.7	77,291
	Ltng Retro _ Hi Perf T8 Replacing Specific Fixtures	BES	20	\$	600	2.0	10,501
			61	\$	1,480	3.5	10,908

				120	\$	1,920	4.1	11,034
	Ltng Retro _ LED & Induction Tech	BES		12	\$	300	0.8	2,895
				13	\$	156	0.2	2,163
	Ltng Retro _ Rducd Wtg Flr T8 Lamps	BES		44	\$	22	0.2	509
	Ltng Retro _ Rducd Wtg T8 CEE Qual	BES		170	\$	3,024	9.9	36,489
	Ltng Retro _ T5HO Hi Bay Fix w-Elec Bal	BES		42	\$	2,940	3.7	8,727
	Ltng Retro _ T8 Hi Bay Fix w-Elec Bal	BES		11	\$	935	2.4	5,788
				12	\$	1,020	2.7	6,620
				41	\$	3,485	12.1	62,162
				80	\$	6,380	28.1	117,894
	Ltng Retro _Flrscnt T8 & T5 w/Elec Bal	BES		16	\$	138	0.4	1,131
	Ltng Retro_Rducd Wtg T8 Fixture	BES		13	\$	198	0.8	2,865
					\$	<b>28,180</b>	<b>95.3</b>	<b>426,462</b>
Res HVAC	HVAC Air_Source HP - 14.5 SEER	BES		1	\$	250	0.2	1,581
	Programmable Thermostat - Heat Pump	BES		1	\$	25	0.0	1,114
					\$	<b>275</b>	<b>0.2</b>	<b>2,695</b>
<b>2012 Total</b>					\$	<b>36,880</b>	<b>137.8</b>	<b>621,203</b>
2013	CI HVAC							
	Air Cooled Chillers w-Condenser	BES		1	\$	6,132	11.0	38,065
	CO2 Demand Controlled Ventilation	BES		1	\$	1,240	4.1	6,800
	Window Film	BES		1	\$	1,076	2.7	6,378
					\$	<b>8,448</b>	<b>17.9</b>	<b>51,243</b>
	Compressed Air System							
	Compressed Air System Leak Survey	BES		1	\$	82	2.7	4,581
					\$	<b>82</b>	<b>2.7</b>	<b>4,581</b>
	Custom Electric Program							
	Heat Pipe Recovery Unit rated at 18,000 CFM	BES		1	\$	8,304	27.5	4,158
	Lighting project at college	BES		1	\$	9,319	31.1	159,485
	11 fume hoods at 6 ft width each with vertical sash sensor	BES		1	\$	16,957	50.5	180,084
					\$	<b>34,579</b>	<b>109.1</b>	<b>343,727</b>
	Energy Star Appliance							
	Energy Star Clothes Washer	BES		1	\$	150	0.1	393
				2	\$	100	0.0	262
	Energy Star Decorative Lights	BES		5	\$	18	0.0	391
	Energy Star Dehumidifier	BES		1	\$	10	0.1	90
	Energy Star Dishwasher	BES		2	\$	50	0.1	120
	Energy Star Refrigerators	BES		1	\$	200	0.2	1,620
				2	\$	200	0.2	1,620
				5	\$	250	0.2	2,025
					\$	<b>978</b>	<b>0.9</b>	<b>6,521</b>
	Food Service							
	ES Comm Solid Door Refrigerators	BES		1	\$	100	0.1	470
	ES Holding Cabinets	BES		1	\$	300	0.5	2,831
	Hood Temp and Optical Sensor Ctlg							
	Make Up Air Units	BES		1	\$	90	0.3	1,752
	Hood Temp Sensor Only Ctlg Make Up Air Units	BES		1	\$	25	0.1	467
					\$	<b>515</b>	<b>1.0</b>	<b>5,520</b>
	Lighting - New Const							
	T8 4ft Hi Bay Fixture	BES		17	\$	850	2.5	6,041
				138	\$	6,900	27.6	54,435
					\$	<b>7,750</b>	<b>30.2</b>	<b>60,476</b>
	Lighting - Retrofit							
	LED & Induction Tech	BES		4	\$	48	0.1	666
				60	\$	1,500	4.0	10,686
				368	\$	5,142	17.5	128,233
	Rducd Wtg T8 Lamps ONLY	BES		8	\$	8	0.0	104
	Reduced Wtg T8 4ft CEE Qual	BES		346	\$	5,358	17.4	64,075

			558	\$	6,341	23.9	175,703
	T8 2ft w/Elec Bal	BES	7	\$	42	0.1	254
	T8 4ft w/ Bal Repl 8ft T12 HO	BES	35	\$	1,050	3.6	7,080
	T8 4ft w/Elec Bal	BES	25	\$	325	1.0	2,064
	CFL Fixtures and Lamps	BES	237	\$	356	13.0	25,769
	T8 Hi Bay Fixtures w/ 4ft Lamps	BES	45	\$	3,825	13.3	68,227
				\$	<b>23,994</b>	<b>93.8</b>	<b>482,861</b>
	HVAC Mini Split_Ductless Air_Source						
	HP	BES	1	\$	200	0.4	6,470
	Programmable Thermostat - Heat Pump	BES	1	\$	25	0.1	1,114
				\$	<b>225</b>	<b>0.5</b>	<b>7,584</b>
<b>2013 Total</b>				\$	<b>76,569</b>	<b>256.0</b>	<b>962,513</b>
<b>Grand Total</b>				\$	<b>149,435</b>	<b>500.3</b>	<b>2,188,676</b>



## Appendix 2 – Valley City Resolution

### RESOLUTION No. 1983

#### RESOLUTION APPROVING

#### INTEGRATED RESOURCE PLAN SUMMARY REPORT

WHEREAS, The City of Valley City through Valley City Public Works purchases a significant portion of its power supply from the Western Area Power Administration (Western); and

WHEREAS, Western has recently published its Energy Planning and Management Program Rules specifying the requirements for preparing and filing of an Integrated Resource Plan (IRP); and

WHEREAS, The Valley City Public Works staff has prepared an IRP Summary Report describing the IRP process used and the information and assumptions used to develop the IRP; and

WHEREAS, Valley City Public Works customers were informed of our IRP and resulting Action Plans through various means including a public meeting where public questions and comments were encouraged; and

WHEREAS, Any public comments received have been addressed in order to strengthen the city's Integrated Resource Plan; and

WHEREAS, The IRP Summary Report includes 5-year and 2-year action plans outlining actions to be taken by Valley City Public Works during the next several years.

NOW THEREFORE BE IT RESOLVED BY THE BOARD OF CITY COMMISSIONERS OF THE CITY OF VALLEY CITY, BARNES COUNTY, NORTH DAKOTA, That the Integrated Resource Plan Summary Report for the City of Valley City dated August 2014 is hereby approved for filing with Western under the energy Planning and Management Program.

Passed and approved this 19<sup>th</sup> day of August, 2014.



Robert J. Werkhoven, President of the Board of  
City Commissioners of the City of Valley City,  
Barnes County, North Dakota

ATTEST:



Avis Richter, Auditor of the City of Valley City,  
Barnes County, North Dakota